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GLOBAL DATA MONITORING REPORT

July 1999

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700

Figure	Parameter Plotted	Layer (hPa)
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.| bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
CG2960	ALL	P	SUR	44	0	0	4.2	4.0	5.8
DGDD	ALL	P	SUR	75	0	0	1.1	-4.7	4.8
ELLY4	ALL	P	SUR	59	17	29	4.0	-6.2	7.4
ELTE6	ALL	P	SUR	46	1	2	1.5	-4.5	4.8
ELUB5	ALL	P	SUR	24	1	4	1.4	5.1	5.3
ELVI2	ALL	P	SUR	71	0	0	0.9	-5.1	5.1
OZLB	ALL	P	SUR	40	1	2	0.7	-4.2	4.3
PCCQ	ALL	P	SUR	26	0	0	1.5	-6.0	6.2
PCCZ	ALL	P	SUR	23	0	0	1.1	11.3	11.4
VGFQ	ALL	P	SUR	26	22	85	7.1	-5.9	9.2
VVGG	ALL	P	SUR	22	0	0	1.8	5.9	6.2
VYNG	ALL	P	SUR	47	46	98	0.0	4.2	4.2
V2PC4	ALL	P	SUR	36	10	28	0.9	0.4	1.0
V7BB2	ALL	P	SUR	22	22	100			
WDZB	ALL	P	SUR	33	0	0	0.9	-5.7	5.8
WUW2120	ALL	P	SUR	31	13	42	4.0	-2.9	4.9
ZCAM9	ALL	P	SUR	53	11	21	2.0	11.8	12.0
ZSDN	ALL	P	SUR	57	0	0	1.4	6.4	6.6
3FGN3	ALL	P	SUR	30	0	0	1.3	-7.4	7.5
3FGQ3	ALL	P	SUR	28	0	0	3.2	7.2	7.9
48102	ALL	P	SUR	293	189	65	2.2	-0.7	2.3
48111	ALL	P	SUR	556	335	60	2.4	0.3	2.5
62026	ALL	P	SUR	562	544	97	7.7	-1.3	7.8
62142	ALL	P	SUR	543	0	0	0.7	4.8	4.8
WIND SPEED									
C6NI3	ALL	SPEED	SUR	31	0	0	4.1	7.3	8.3
C6QD2	ALL	SPEED	SUR	50	0	0	4.2	5.6	7.0
DDFT	ALL	SPEED	SUR	26	0	0	4.1	5.4	6.8
DUQM	ALL	SPEED	SUR	49	0	0	6.3	5.5	8.4
DUXW	ALL	SPEED	SUR	20	0	0	4.6	5.6	7.2
ELTZ2	ALL	SPEED	SUR	21	0	0	5.8	8.2	10.0
ELWC6	ALL	SPEED	SUR	37	0	0	5.6	13.4	14.6
MYLZ6	ALL	SPEED	SUR	31	0	0	5.9	5.0	7.7
PJAG	ALL	SPEED	SUR	42	0	0	5.0	5.7	7.6
VRVD6	ALL	SPEED	SUR	28	0	0	5.1	7.2	8.8
V2TE	ALL	SPEED	SUR	26	0	0	4.8	7.3	8.7
9MBQ4	ALL	SPEED	SUR	21	0	0	4.0	6.7	7.8

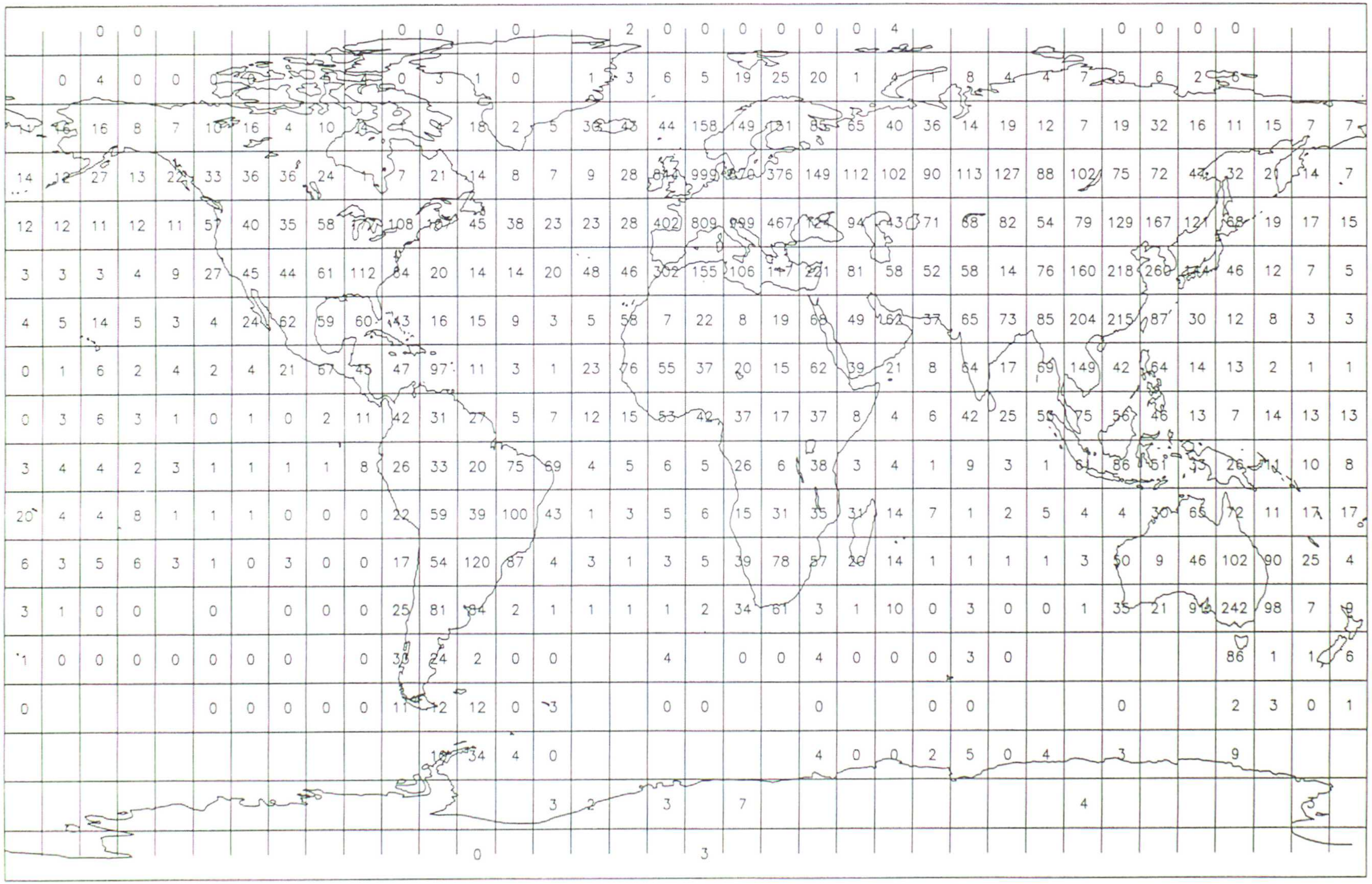
AVAILABILITY – SHIP/SYNOP – JULY 1999

FIGURE 1

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS =   20007



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	0	4	0	0	0	0		5	4	0	3	1	0		1	3	6	5	19	25	20	1	4	1	8	4	4	7	5	6	2	6			
11	16	16	8	7	10	16	4	10	14	1	4	18	2	5	36	43	44	158	149	131	85	65	40	36	14	19	12	7	19	32	16	11	15	7	7
14	12	27	13	22	33	36	36	24	1	7	21	14	8	7	9	28	814	999	870	376	149	112	102	90	113	127	88	102	75	72	47	32	21	14	7
12	12	11	12	11	57	40	35	58	172	108	167	45	38	23	23	28	402	809	999	467	124	94	43	71	68	82	54	79	129	167	121	68	19	17	15
3	3	3	4	9	27	45	44	61	112	84	20	14	14	20	48	46	302	155	106	147	221	81	58	52	58	14	76	160	218	260	144	46	12	7	5
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20	4	4	8	1	1	1	0	0	0	22	59	39	100	43	1	3	5	6	15	31	35	31	14	7	1	2	5	4	4	30	65	72	11	17	17
6	3	5	6	3	1	0	3	0	0	17	54	120	87	4	3	1	3	5	39	78	57	20	14	1	1	1	1	3	50	9	46	102	90	25	4
3	1	0	0		0		0	0	0	25	81	84	2	1	1	1	1	2	34	61	3	1	10	0	3	0	0	1	35	21	96	242	98	7	9
1	0	0	0	0	0	0	0		0	33	24	2	0	0			4		0	0	4	0	0	0	3	0						86	1	1	6
0					0	0	0	0	0	11	12	12	0	3			0	0			0			0	0				0			2	3	0	1
											18	34	4	0							4	0	0	2	5	0	4		3			9			
														3	2		3		7									4						3	
												0						3																	

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA : NOBS ≥ 20 , and one or more of the following:

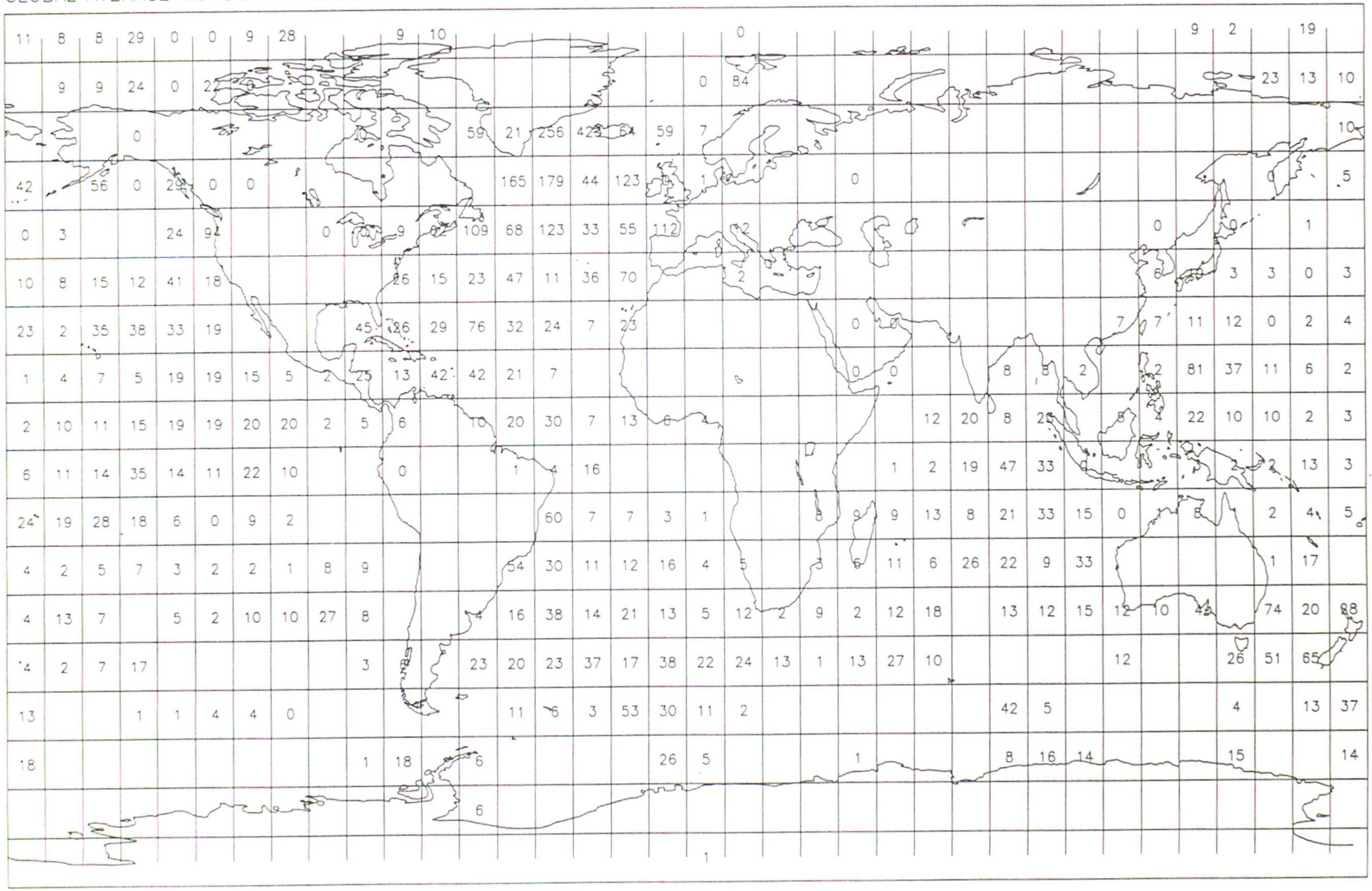
1.| bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
14914	-25.7	77.8	ALL	P	SUR	190	6	3	3.6	5.1	6.2
17513	-44.7	21.7	ALL	P	SUR	46	2	4	3.7	5.9	6.9
17904	-42.7	17.6	ALL	P	SUR	60	6	10	5.6	5.6	7.9
17905	-43.9	45.8	ALL	P	SUR	124	36	29	3.1	9.8	10.3
34913	-36.5	-82.2	ALL	P	SUR	256	0	0	3.7	4.1	5.6
34915	-33.9	-92.4	ALL	P	SUR	216	7	3	3.3	5.0	6.0
48580	79.9	-128.8	ALL	P	SUR	57	37	65	0.3	14.4	14.4
54919	-33.6	-104.9	ALL	P	SUR	180	137	76	3.2	-10.0	10.5
54923	-26.9	-91.1	ALL	P	SUR	191	0	0	1.1	-4.1	4.2
54924	-49.9	-145.8	ALL	P	SUR	31	3	10	6.6	-0.7	6.6
56608	-35.6	64.7	ALL	P	SUR	103	96	93	1.6	-12.0	12.1
WIND DIRECTION											
41641	14.5	-47.1	ALL	DIRN.	SUR	63	0	0	17.2	35.4	39.3
52624	-14.0	138.0	ALL	DIRN.	SUR	121	0	0	16.5	39.5	42.8
55587	-43.9	167.8	ALL	DIRN.	SUR	216	0	0	18.6	45.8	49.5

AVAILABILITY – DRIFTER – JULY 1999
MAIN HOURS ONLY
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 6318

FIGURE 2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0 59 21 256 423 64 59 7 10
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10 8 15 12 41 18 26 15 23 47 11 36 70 2 6 3 3 0 3
23 2 35 38 33 19 45 26 29 76 32 24 7 23 0 0 7 7 11 12 0 2 4
1 4 7 5 19 19 15 5 2 25 13 42 42 21 7 0 0 8 8 2 2 81 37 11 6 2
2 10 11 15 19 19 20 20 2 5 6 10 20 30 7 13 6 4 12 20 8 25 5 4 22 10 10 2 3
6 11 14 35 14 11 22 10 0 1 4 16 1 2 19 47 33 6 2 13 3
24 19 28 18 6 0 9 2 60 7 7 3 1 8 9 9 13 8 21 33 15 0 8 2 4 5
4 2 5 7 3 2 2 1 8 9 54 30 11 12 16 4 5 3 6 11 6 26 22 9 33 1 17
4 13 7 5 2 10 10 27 8 4 16 38 14 21 13 5 12 2 9 2 12 18 13 12 15 12 10 45 74 20 88
4 2 7 17 3 23 20 23 37 17 38 22 24 13 1 13 27 10 12 26 51 65
13 1 1 4 4 0 11 6 3 53 30 11 2 42 5 4 13 37
18 1 18 6 26 5 1 8 16 14 15 14
6
1

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for synops & autosynops.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).

Parameters monitored :HT(m) :Station height (in metres) as given in WMO No. 9 Vol A

:RP :Pressure reporting practice
M=mean sea level pressure (hPa) reported.
S=Station level pressure reported.
8=Geopotential height (m) of 850 hPa surface reported.
7=Geopotential height (m) of 700 hPa surface reported.

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1.| bias| ≥ 4 hPa
2. SD ≥ 6 hPa
3.PGE ≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60010	28.3N	16.5W	2367	S7	79	0	0	11	1.5	-8.1	8.2
60445	36.2N	5.4E	1081	S8	104	1	1	1	0.7	4.4	4.5
60468	35.6N	6.2E	1052	S8	101	101	100	0			
60511	35.3N	1.4E	1127	S8	102	47	46	0	0.4	14.3	14.3
60535	34.7N	3.3E	1144	S8	72	0	0	0	0.7	-5.7	5.7
60670	24.6N	9.5E	1054	S8	101	1	1	0	0.9	9.2	9.2
63330	13.5N	39.5E	2070	MS	52	52	100	0			
63334	10.3N	37.7E	2515	MS	43	0	0	0	0.9	10.6	10.6
63402	7.7N	36.8E	1725	MS	91	0	0	1	2.0	6.5	6.8
63471	9.6N	41.9E	1260	MS	94	1	1	0	0.8	9.4	9.4
63478	5.9N	43.6E	295	MS	53	0	0	0	0.7	6.6	6.6
63602	3.1N	30.9E	1204	S	34	33	97	0	0.0	6.0	6.0
68396	26.5S	31.3E	641	S8	49	1	2	2	1.4	4.8	5.0

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30320	56.9N	105.7E	669	S	99	49	49	0	1.3	0.9	1.6
38069	44.2N	66.8E	153	M	92	1	1	2	1.3	-6.3	6.4
40743	36.2N	57.7E	941	MS	101	1	1	0	0.7	-5.2	5.2
40762	35.3N	59.2E	1333	MS	104	1	1	1	3.0	-12.2	12.6
41254	23.1N	57.7E	1755	S8	82	82	100	0			
41396	16.0N	48.9E	700	MS	41	0	0	2	1.7	6.2	6.4
41535	34.2N	73.3E	1308	8	26	1	4	4	0.8	-5.4	5.5
44416	28.6N	81.6E	720	MS	60	4	7	2	1.2	4.8	4.9
44477	27.0N	87.4E	1445	S8	51	51	100	0			
47022	40.8N	128.2E	1200	S	61	0	0	0	0.7	4.3	4.4
51495	43.5N	91.6E	874	M	113	0	0	0	1.1	7.9	8.0
52602	38.8N	93.4E	2734	S	114	0	0	0	1.0	-4.4	4.5
52955	35.6N	100.8E	3201	S	114	0	0	0	0.8	12.8	12.8
53588	39.0N	113.5E	2898	S	112	112	100	0			
54587	39.1N	123.2E	94	M	97	1	1	1	1.1	-4.1	4.2
56444	28.5N	98.9E	3488	S	111	84	76	24	0.6	14.1	14.1
56462	29.0N	101.5E	2994	S	113	0	0	2	1.0	8.8	8.9
56954	22.6N	99.9E	1054	M	114	0	0	2	0.8	4.0	4.1

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	30	0	0	0	1.3	-5.3	5.5
80475	7.6N	72.1W	327	MS	20	0	0	30	1.1	4.5	4.6
82336	3.1S	58.4W	40	MS	73	0	0	29	2.4	-7.9	8.3
82586	5.2S	39.3W	212	MS	71	0	0	39	0.6	-4.6	4.6
82704	7.6S	72.7W	170	MS	73	0	0	0	0.9	-4.3	4.4
83214	10.3S	54.9W	285	MS	66	4	6	6	1.0	-8.2	8.3
83235	12.4S	46.4W	604	MS	77	1	1	4	1.4	6.1	6.3
83319	14.7S	52.4W	315	MS	76	0	0	0	0.8	-5.9	6.0
83332	14.1S	46.4W	826	MS	77	2	3	1	1.2	13.5	13.6
83376	15.9S	49.0W	740	MS	78	0	0	0	0.6	-4.5	4.5
83408	14.3S	43.8W	447	MS	63	0	0	2	1.2	10.0	10.1
83423	16.7S	49.3W	741	MS	76	0	0	0	0.6	-5.4	5.4
83488	17.8S	42.9W	1097	MS	69	69	100	0			
83531	18.6S	46.5W	940	MS	68	0	0	0	0.9	-8.1	8.1
83587	19.9S	43.9W	850	MS	71	1	1	0	0.7	-7.1	7.1
83773	23.1S	48.9W	793	S	39	0	0	46	0.8	-10.3	10.3
83836	25.5S	50.6W	837	MS	77	0	0	0	0.7	-4.8	4.9
84401	5.2S	80.6W	49	MS	64	0	0	0	1.0	5.1	5.2
84455	6.5S	76.4W	281	MS	54	0	0	0	1.4	5.2	5.4
84472	7.1S	78.5W	2620	S	32	2	6	0	0.9	-5.8	5.9

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
84501	8.1S	79.0W	26	MS	68	0	0	1	0.8	4.1	4.2
84686	13.6S	72.0W	3248	S	69	0	0	1	1.4	-5.1	5.3
84720	14.9S	75.0W	567	MS	40	0	0	0	0.9	4.4	4.5
84782	18.1S	70.3W	468	MS	70	0	0	0	1.3	7.9	8.0
85312	19.8S	63.9W	992	S	43	8	19	21	1.2	-12.9	13.0
85406	18.3S	70.3W	55	M	112	0	0	0	1.1	5.2	5.3
85432	22.5S	68.9W	2320	S8	79	0	0	0	0.9	4.7	4.8
85836	43.6S	71.8W	277	M	42	0	0	0	1.7	5.7	5.9

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
72376	36.8N	108.2W	1677	M	111	0	0	35	1.3	6.3	6.4
76118	30.4N	109.7W	1040	MS	39	1	3	0	1.0	-9.5	9.6
76632	20.1N	98.7W	2417	MS	29	0	0	0	0.4	-5.3	5.3
76658	19.2N	103.7W	494	MS	47	0	0	2	1.3	6.3	6.4
76750	18.5N	88.3W	9	MS	92	0	0	0	1.0	-8.1	8.2
76775	17.1N	96.7W	1550	MS	70	0	0	0	0.8	4.5	4.6
76845	16.7N	92.6W	2276	MS	105	105	100	0			
78718	14.4N	87.6W	626	MS	47	45	96	0	0.3	-14.2	14.2

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	329	329	100	0			
94955	41.6S	145.7E	684	MS	113	49	43	0	1.3	0.8	1.5
95909	36.5S	148.3E	1957	MS	114	114	100	0			
95952	41.9S	145.6E	560	MS	112	50	45	0	1.0	-1.2	1.6
96505	3.7N	115.7E	914	S8	26	26	100	0			
96751	6.7S	106.9E	943	S8	71	34	48	0	1.3	-4.2	4.4

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	112	0	0	0	0.7	5.5	5.5
04207	81.7N	59.9W	105	MS	69	0	0	0	1.0	-4.5	4.6
16227	41.9N	13.6E	655	MS	340	335	99	0	0.1	-14.8	14.8
17042	41.4N	41.4E	33	M	105	0	0	17	0.8	4.2	4.3
17092	39.8N	39.5E	1218	S8	114	0	0	0	1.5	7.1	7.3

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89272	75.0S	70.8W	1395	S	232	30	13	0	1.6	-11.8	11.9
89744	74.0S	43.0E	3353	S	259	0	0	0	1.3	8.0	8.1
89816	66.8S	112.8E	1375	S	230	0	0	2	2.3	-4.0	4.6

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in $m\ s^{-1}$

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 $m\ s^{-1}$ Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	75	0	32	1.7	0.8	74	0	32	0	7.4	0.2
AAH	97	2	18	1.1	0.1	96	0	16	0	7.0	1.0
AAL	5584	0	17	1.6	0.1	5549	0	17	0	8.2	1.1
AAR	1679	0	7	1.7	-0.6	1631	0	8	0	7.6	0.5
ACA	2403	1	7	1.9	-0.1	2417	0	7	0	7.6	0.7
ACI	72	8	56	1.1	0.3	69	0	54	0	12.2	5.1
AEA	507	0	5	2.1	1.1	450	1	7	0	7.6	0.6
AEL	616	1	16	2.2	0.4	626	0	16	0	8.0	0.8
AEY	91	1	5	2.2	1.5	89	0	7	0	8.1	1.7
AFL	497	0	7	2.5	0.5	495	0	7	0	8.1	1.2
AFR	1979	1	10	1.8	0.2	1969	0	10	0	7.4	0.8
AIH	234	0	4	1.8	0.3	229	0	5	0	6.5	0.2
AJM	131	0	3	1.4	-0.4	127	0	4	0	6.4	1.3
AMM	113	1	5	1.8	0.7	108	0	6	0	6.9	1.3
AMT	1056	1	37	1.8	0.4	1063	0	37	0	6.4	0.9
AMX	321	1	4	1.7	0.2	320	1	4	0	8.0	1.5
ANA	1241	0	6	1.7	-0.2	1214	0	8	0	7.3	0.3
ANZ	4802	1	38	1.7	0.0	4747	0	38	0	7.7	0.6
AOM	1046	1	9	2.0	1.1	1050	0	9	0	7.4	1.2
ARG	50	6	22	2.8	0.5	50	2	20	0	15.6	2.3
AUA	23	0	0	1.9	0.2	22	0	0	0	6.4	0.0
AVA	557	1	5	1.7	0.2	561	0	5	0	8.3	1.8
AVE	305	1	4	1.7	1.0	302	0	7	0	9.4	2.4
AVN	110	4	30	1.5	0.2	109	0	27	0	9.7	-1.4
AXF	84	5	36	1.6	0.0	80	0	31	0	7.6	0.2
AZA	646	1	9	2.3	0.5	629	0	10	0	8.7	1.2
BAF	27	0	7	1.4	-0.3	27	0	7	0	5.7	0.3
BAL	426	0	14	1.6	-0.6	422	0	13	0	8.0	0.8
BAW	1801	0	14	2.0	-0.2	1779	0	15	0	8.1	0.9
BLX	55	0	7	1.9	-0.3	59	0	10	0	8.1	0.5
BWA	381	1	6	1.9	1.3	378	0	6	0	7.2	1.5
CAL	560	1	6	1.6	0.3	561	0	6	0	8.1	0.1
CCA	235	3	9	2.5	0.7	247	2	100	0	9.6	0.3
CDN	2436	0	6	1.7	0.2	2397	0	7	0	7.6	0.6
CES	312	1	5	1.7	0.6	321	0	7	0	8.8	0.1
CFG	1022	0	4	2.2	-0.1	1007	0	3	0	7.4	0.6
CKS	429	1	38	1.6	0.4	437	0	37	0	6.1	0.7
CKT	248	0	4	2.1	1.5	233	0	4	0	7.5	0.9
CLX	454	0	8	2.1	-0.3	450	0	8	0	7.3	0.3
CMI	502	1	5	2.0	1.0	488	0	4	0	9.1	1.7
CMM	859	1	9	1.8	0.1	838	0	8	0	6.5	1.0
COA	1639	1	18	1.8	0.3	1646	0	21	0	11.5	2.4
CPA	80	4	8	1.7	0.2	81	0	4	0	6.4	0.3
CRL	880	1	5	1.6	0.6	867	0	6	0	6.5	1.1
CSA	25	0	8	2.1	-0.9	24	0	8	0	14.4	0.0
CSN	62	0	8	1.6	0.6	59	0	7	0	5.6	0.8
CTB	303	0	3	1.6	-0.2	301	0	3	0	6.3	1.3
CTM	67	1	27	3.3	-0.9	66	0	18	0	6.4	1.2
CUB	539	1	7	2.2	0.9	539	0	7	0	7.9	0.9
DAL	4701	0	27	1.6	0.1	4730	0	28	0	7.4	0.7
DBY	840	0	4	1.4	-0.2	835	0	4	0	7.1	0.8
DLH	3090	0	9	2.0	-0.1	2991	0	10	0	7.8	0.9
EEZ	45	2	11	1.9	-0.4	48	0	13	0	6.4	0.1
EIA	360	1	37	1.6	0.8	353	0	38	0	8.9	2.0
ELY	179	0	6	1.8	0.0	180	0	7	0	7.9	1.9
ETH	26	0	31	1.9	-0.2	30	0	37	0	11.8	-1.0
EVA	2127	1	5	1.3	-0.3	2118	0	5	0	6.6	0.0
EWW	76	0	4	1.8	0.0	80	0	4	0	8.8	1.0
FDX	1410	0	20	1.4	0.5	1411	0	21	0	8.1	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FIN	576	0	9	2.3	0.4	561	0	9	0	8.0	0.9
FJI	1176	2	40	1.7	0.6	1145	1	39	0	8.0	0.5
FOM	309	4	39	1.8	-0.3	301	0	35	0	8.6	0.2
FWQ	41	2	56	1.1	0.5	41	0	56	0	9.1	-2.5
GAF	60	0	8	2.2	-0.2	59	0	7	0	9.9	1.9
GHA	68	0	0	1.4	0.2	66	0	2	0	8.0	1.8
GIA	42	0	21	1.6	0.8	42	0	21	0	6.2	1.2
GRL	48	0	0	1.4	0.0	45	2	2	0	5.6	0.5
GTI	117	1	9	1.9	0.1	124	0	9	0	6.9	0.8
HAL	3172	1	33	1.4	0.3	3134	0	34	0	8.3	1.3
HLF	109	1	7	1.3	-0.7	109	0	7	0	6.7	1.3
HRH	173	10	68	1.5	0.1	171	1	64	0	7.3	0.3
HVN	24	4	4	1.7	0.2	24	0	0	0	6.0	0.9
IBE	3488	1	17	2.0	0.7	3466	0	17	0	7.9	0.9
ICE	1050	0	6	2.0	0.2	1030	0	6	0	7.8	1.0
IRL	24	0	0	2.6	2.4	24	0	4	0	7.5	1.8
IWD	231	1	6	1.5	-0.2	226	0	5	0	7.4	1.4
JAL	6900	0	4	1.6	0.2	6691	0	4	0	7.1	0.8
JKK	231	0	6	1.5	0.0	201	0	8	0	10.3	0.1
KAL	3982	0	7	1.6	-0.3	3899	0	8	0	7.6	0.5
KIW	38	3	47	3.6	2.5	37	0	46	0	10.6	0.0
KLM	3152	0	12	1.7	0.3	3132	0	13	0	7.5	1.2
LAN	43	0	9	2.7	0.8	43	0	7	0	11.0	-2.0
LAP	47	2	21	3.3	1.1	47	2	11	0	13.3	3.1
LDA	84	1	10	1.7	0.2	84	0	10	0	9.7	-0.7
LDI	526	0	11	1.6	-0.6	519	0	11	0	7.3	0.6
LGL	25	0	4	1.9	-1.2	25	0	8	0	11.0	-0.2
LIB	410	1	5	1.8	1.1	407	0	4	0	6.8	1.2
LOT	345	1	7	2.3	-1.2	344	0	7	0	7.0	0.2
LPR	27	7	7	2.8	0.3	31	3	6	0	9.8	-0.2
LTU	886	1	9	1.6	-0.3	867	0	9	0	7.8	0.9
LXR	50	0	4	1.5	1.0	50	0	4	0	6.9	1.1
MAS	476	1	7	1.5	0.1	481	0	7	0	7.6	0.5
MDA	20	0	0	1.5	-0.4	21	0	5	0	9.8	0.9
MON	240	2	7	1.8	0.2	232	0	5	0	6.0	1.0
MPD	398	1	5	2.0	1.1	392	0	7	0	8.6	1.1
MPH	876	0	5	2.0	-0.7	871	0	6	0	7.7	1.1
NCA	601	1	3	1.7	0.2	603	0	3	0	7.4	0.6
NWA	10531	0	9	1.8	0.7	10155	0	9	0	7.8	0.6
OAE	272	0	38	1.4	0.0	274	0	39	0	6.0	0.7
OAL	27	0	22	3.1	0.7	27	0	19	0	10.9	3.8
PAC	185	3	22	2.0	1.0	188	0	19	0	7.2	1.4
PAL	925	1	2	1.4	-0.2	856	0	3	0	7.1	0.1
PAO	377	1	53	1.5	0.3	371	2	54	0	9.6	-0.1
QFA	2643	1	53	1.7	0.1	2616	0	53	0	7.4	0.3
RAF	71	0	3	2.1	1.0	71	0	4	0	9.4	2.8
RAM	86	2	9	1.4	0.5	86	0	7	0	8.2	2.6
RCH	473	3	23	2.9	1.1	451	0	24	0	11.5	1.2
RJA	43	2	14	2.1	-1.0	42	0	12	0	10.0	2.5
RKA	116	0	2	1.1	-0.1	115	0	3	0	7.9	1.5
ROY	363	1	13	2.1	0.1	360	0	13	0	9.5	0.7
RRR	107	0	10	2.3	0.1	105	0	10	0	6.7	1.3
RYN	559	0	38	1.3	0.6	555	0	38	0	4.7	0.9
RZO	144	3	6	2.2	0.4	144	0	1	0	5.7	1.7
SAA	287	1	5	1.4	0.1	282	0	6	0	7.1	1.2
SAB	33	3	15	2.6	0.0	36	0	14	0	9.4	1.7
SAS	1653	0	2	1.9	-0.3	1627	0	2	0	6.9	0.7
SEU	49	6	12	2.5	2.3	43	0	9	0	12.3	0.3
SIA	854	0	7	1.5	-0.1	863	0	8	0	7.6	0.5

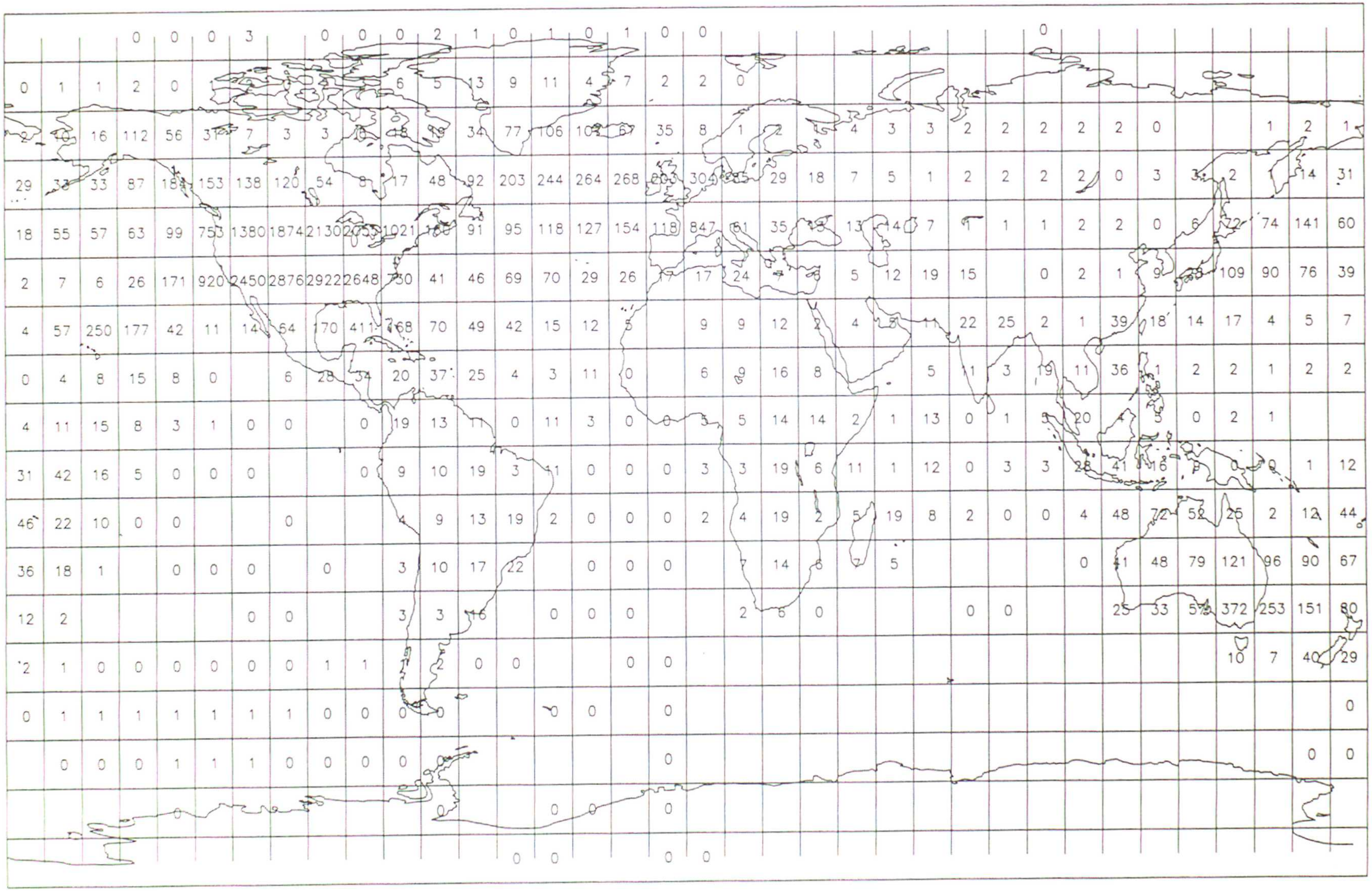
	TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SLR	194	1	55	3.1	0.5	199	0	12	0	7.1	0.6
SOL	52	0	10	1.5	1.0	51	0	10	0	6.6	0.4
SVA	129	1	7	1.9	-0.3	140	0	8	0	7.1	0.2
SVV	25	0	28	4.9	4.2	24	0	4	0	9.0	3.1
SWR	69	1	4	1.3	0.4	70	0	4	0	7.8	0.7
TAP	766	1	6	1.3	-0.2	766	0	7	0	8.6	0.9
TBA	31	0	35	2.5	0.5	32	0	38	0	12.8	3.4
TCO	22	0	0	1.5	0.3	21	0	0	0	5.3	0.7
THA	561	0	3	1.7	-0.2	559	0	4	0	6.6	0.4
THT	66	0	12	2.1	1.5	64	0	11	0	7.3	0.8
TOW	198	2	11	2.1	0.8	198	1	11	0	10.1	2.5
TPA	27	0	11	1.2	0.7	28	0	11	0	10.7	-0.1
TSC	235	0	10	2.3	0.7	236	0	13	0	10.0	1.5
TWA	1566	1	15	1.7	0.2	1502	0	16	0	8.3	0.9
UAL	79091	0	85	1.1	0.1	79025	0	85	0	5.1	0.4
UPS	1436	1	31	1.7	0.3	1434	0	31	0	8.1	0.6
USA	319	2	11	2.1	0.3	265	0	10	0	9.1	1.5
VIR	577	1	5	2.0	-0.2	577	0	5	0	8.0	1.2
VKG	44	2	9	2.3	1.3	43	0	5	0	6.6	0.1
VRG	221	2	23	2.4	0.2	225	1	100	0	12.5	1.4
VSP	46	4	24	2.2	0.4	48	0	21	0	10.6	2.2
VVR	45	2	38	2.5	2.1	48	0	35	0	6.6	1.8
WOA	135	0	7	2.2	0.9	147	0	7	0	9.1	0.1
AN	22529	0	1	1.4	0.2	22528	0	1	0	6.6	0.7
AR	4284	0	100	2.8	2.6	4271	1	1	0	6.6	0.7
BA	30893	0	1	1.4	0.3	30825	0	1	0	6.0	0.8
IT	3863	1	71	1.7	0.5	3813	0	70	0	6.2	1.1
KL	9129	0	8	1.6	0.9	9106	0	8	0	6.6	1.0
LH	2616	0	1	1.9	1.3	2647	0	1	0	6.3	0.9
MK	5354	0	44	2.2	1.8	5325	0	0	0	7.3	0.4
NZ	2362	1	2	1.5	-0.2	2362	0	2	0	6.9	0.9
OZ	56	0	38	1.9	-0.4	56	0	38	0	9.0	0.3
QF	27106	0	3	1.4	0.5	27109	0	3	0	6.1	0.6
QG	178	0	3	1.8	0.3	178	0	3	0	6.3	0.1
SA	3488	0	50	2.5	2.2	3483	0	1	0	6.4	0.5
SK	21	0	0	1.0	-0.2	21	0	0	0	3.9	-0.1
SV	59	100	100	46.3	-32.8	59	0	100	0	22.0	14.0
WA	224	12	18	1.8	0.7	221	2	100	0	8.1	-1.3
XX	2543	2	7	1.4	0.5	3157	0	100	0	10.1	1.8
N	678	1	18	2.2	0.8	685	0	17	0	7.8	1.3
US ACARS	533200	0	11	1.1	0.4	532910	0	12	0	5.4	0.7

MEAN DAILY COUNT OF AIRCRAFT 70 – 500 HPA

FIGURE 3

JULY 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED


0 0 0 3 0 0 0 2 1 0 1 0 1 0 0 0
0 1 1 2 0 6 5 13 9 11 4 7 2 2 0
2 10 16 112 56 31 7 3 3 10 48 19 34 77 106 109 67 35 8 1 2 4 3 3 2 2 2 2 2 0 1 2 1
29 33 33 87 184 153 138 120 54 8 17 48 92 203 244 264 268 603 304 285 29 18 7 5 1 2 2 2 2 0 3 3 2 14 31
18 55 57 63 99 753 1380 1874 2130 2055 1021 160 91 95 118 127 154 118 847 61 35 13 13 14 7 1 1 1 2 2 0 6 72 74 141 60
2 7 6 26 171 920 2450 2876 2922 2648 730 41 46 69 70 29 26 17 17 24 7 6 5 12 19 15 0 2 1 9 58 109 90 76 39
4 57 250 177 42 11 14 54 170 411 168 70 49 42 15 12 5 9 9 12 2 4 5 11 22 25 2 1 39 18 14 17 4 5 7
0 4 8 15 8 0 6 28 34 20 37 25 4 3 11 0 6 9 16 8 5 11 3 19 11 36 1 2 2 1 2 2
4 11 15 8 3 1 0 0 0 19 13 11 0 11 3 0 0 5 5 14 14 2 1 13 0 1 5 20 4 5 0 2 1
31 42 16 5 0 0 0 0 9 10 19 3 11 0 0 0 3 3 19 6 11 1 12 0 3 3 28 41 16 9 0 0 1 12
46 22 10 0 0 0 4 9 13 19 2 0 0 0 2 4 19 2 5 19 8 2 0 0 4 48 72 52 25 2 12 44
36 18 1 0 0 0 0 3 10 17 22 0 0 0 7 14 6 7 5 0 41 48 79 121 96 90 67
12 2 0 0 3 3 16 0 0 0 2 6 0 0 0 25 33 57 372 253 151 80
2 1 0 0 0 0 0 0 1 1 1 2 0 0 0 0 10 7 40 29
0 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 1 1 1 0 0 0 0 0 0 0
0 0 0 0
0 0 0 0

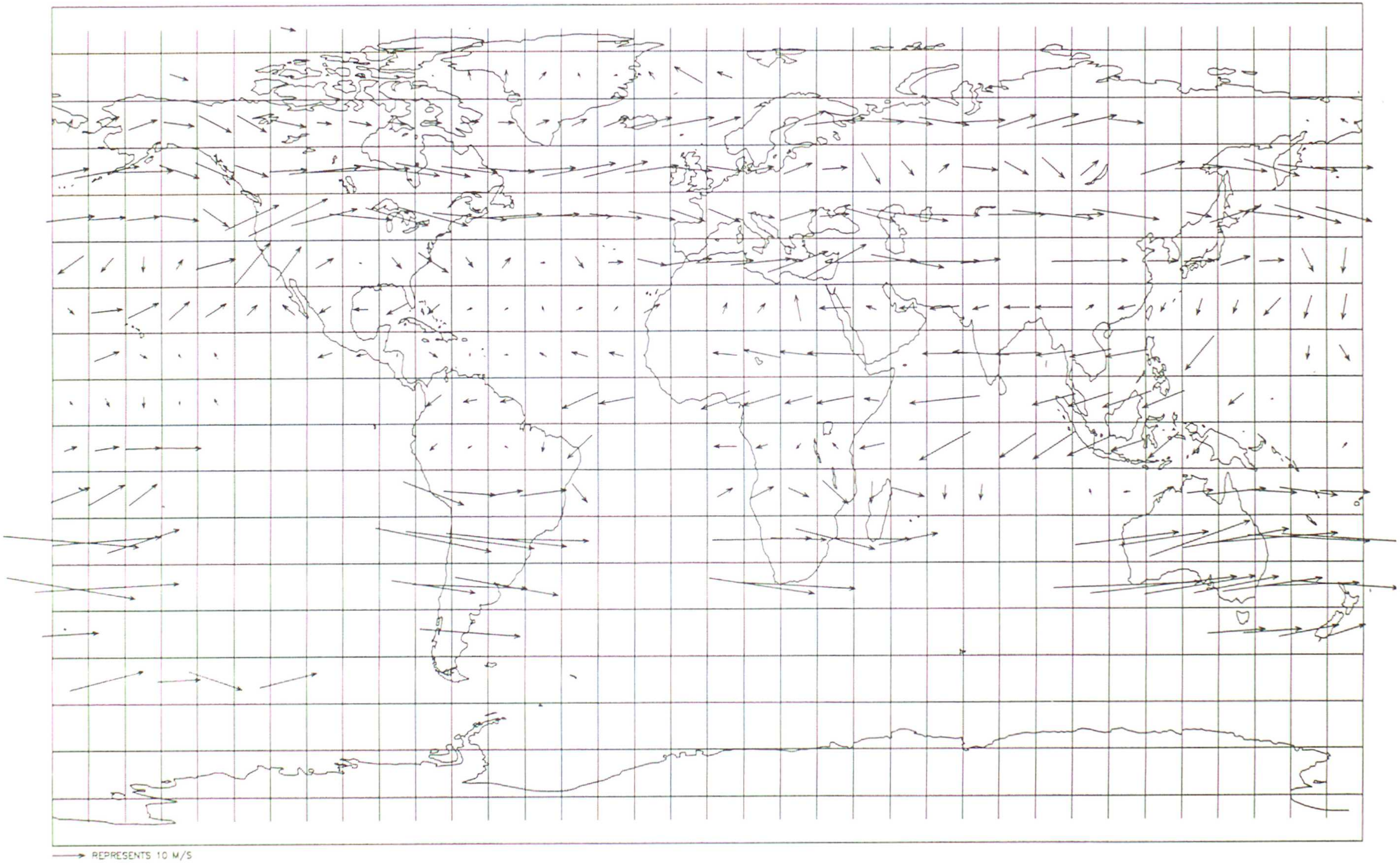
AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA

FIGURE 4

JULY 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



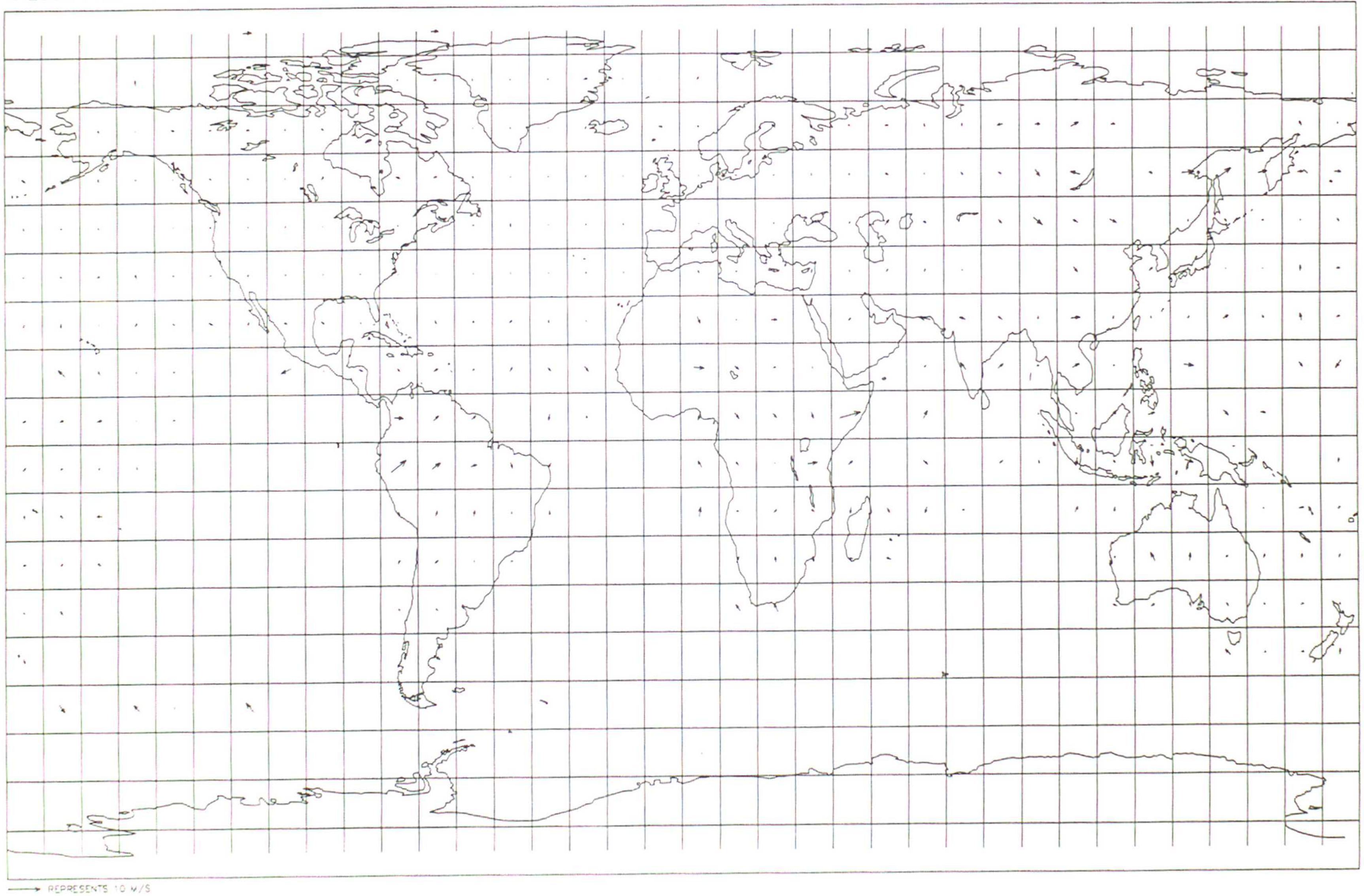
AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA

FIGURE 5

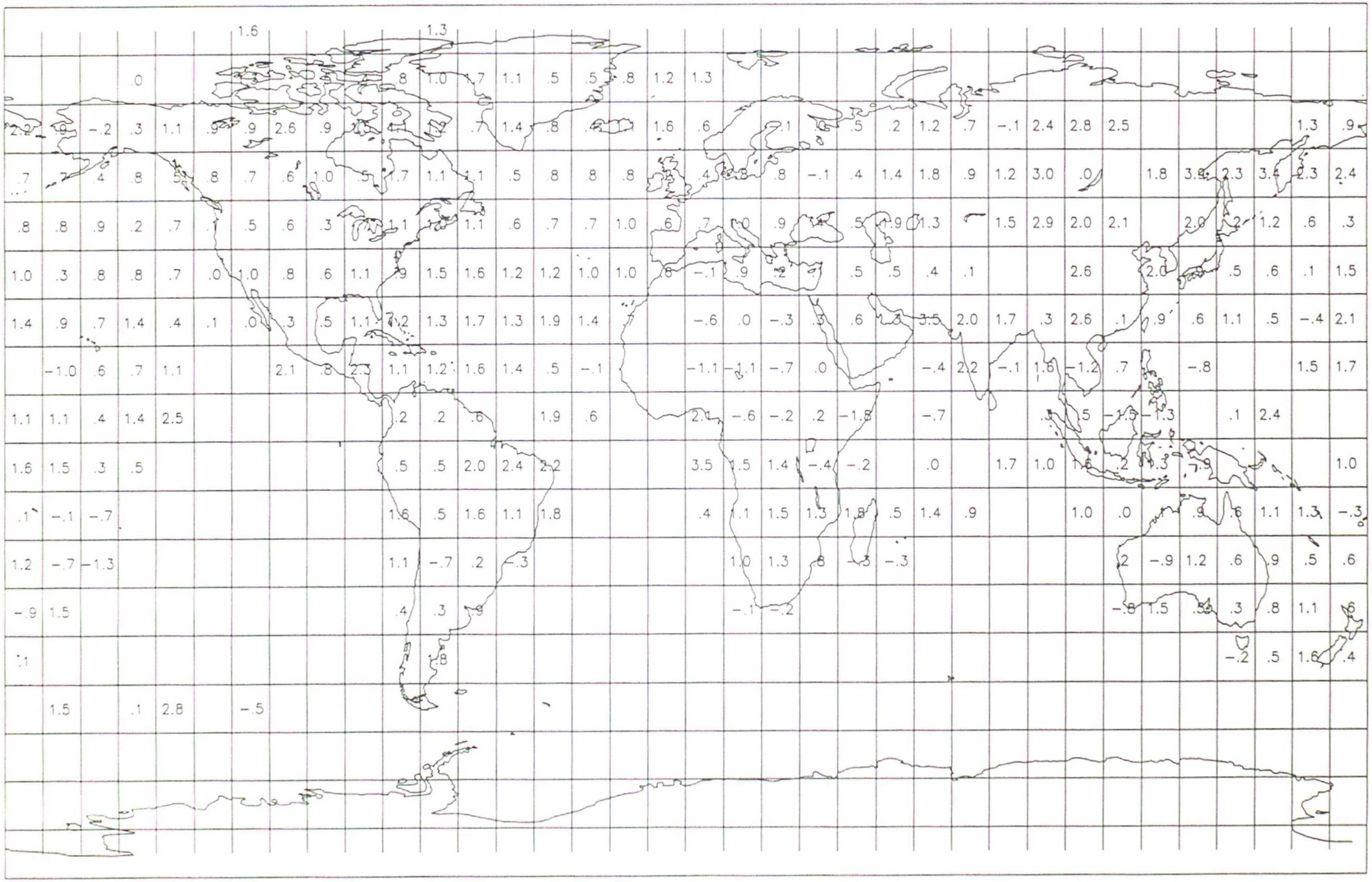
JULY 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT : MEAN O–B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
JULY 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


1.6 1.3
.0 .8 1.0 .7 1.1 .5 .5 .8 1.2 1.3
2.2 .9 –.2 .3 1.1 .9 .9 2.6 .9 .4 .2 .7 1.4 .8 .4 1.6 .6 .1 .0 .5 .2 1.2 .7 –.1 2.4 2.8 2.5 1.3 .9
.7 .7 .4 .8 .5 .8 .7 .6 1.0 .5 .7 1.1 1.1 .5 .8 .8 .8 .4 .8 .8 –.1 .4 1.4 1.8 .9 1.2 3.0 .0 1.8 3.8 2.3 3.4 2.3 2.4
.8 .8 .9 .2 .7 .1 .5 .6 .3 1.1 1.1 .6 .7 .7 1.0 .6 .7 .0 .9 .4 .5 1.9 1.3 1.5 2.9 2.0 2.1 2.0 .2 1.2 .6 .3
1.0 .3 .8 .8 .7 .0 1.0 .8 .6 1.1 .9 1.5 1.6 1.2 1.2 1.0 1.0 .8 –.1 .9 .2 .5 .5 .4 .1 2.6 2.0 .5 .6 .1 1.5
1.4 .9 .7 1.4 .4 .1 .0 .3 .5 1.1 .2 1.3 1.7 1.3 1.9 1.4 –.6 .0 –.3 .3 .6 .3 3.5 2.0 1.7 .3 2.6 .1 .9 .6 1.1 .5 –.4 2.1
–1.0 .6 .7 1.1 2.1 .8 2.3 1.1 1.2 1.6 1.4 .5 –.1 –1.1 –1.1 –.7 .0 –.4 2.2 –.1 1.6 –1.2 .7 –.8 1.5 1.7
1.1 1.1 .4 1.4 2.5 .2 .2 .6 1.9 .6 2.1 –.6 –.2 .2 –1.8 –.7 .5 –1.5 –1.3 .1 2.4
1.6 1.5 .3 .5 .5 .5 2.0 2.4 2.2 3.5 1.5 1.4 –.4 –.2 .0 1.7 1.0 1.6 .2 1.3 –.9 1.0
.1 –.1 –.7 1.6 .5 1.6 1.1 1.8 .4 1.1 1.5 1.3 1.8 .5 1.4 .9 1.0 .0 .1 .9 .6 1.1 1.3 –.3
1.2 –.7 –1.3 1.1 –.7 .2 –.3 1.0 1.3 .8 –.3 –.3 .2 –.9 1.2 .6 .9 .5 .6
–.9 1.5 .4 .3 .9 –.1 –.2 –.8 1.5 .5 .3 .8 1.1 .6
.1 .8 –.2 .5 1.6 .4
1.5 .1 2.8 –.5

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
JULY 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

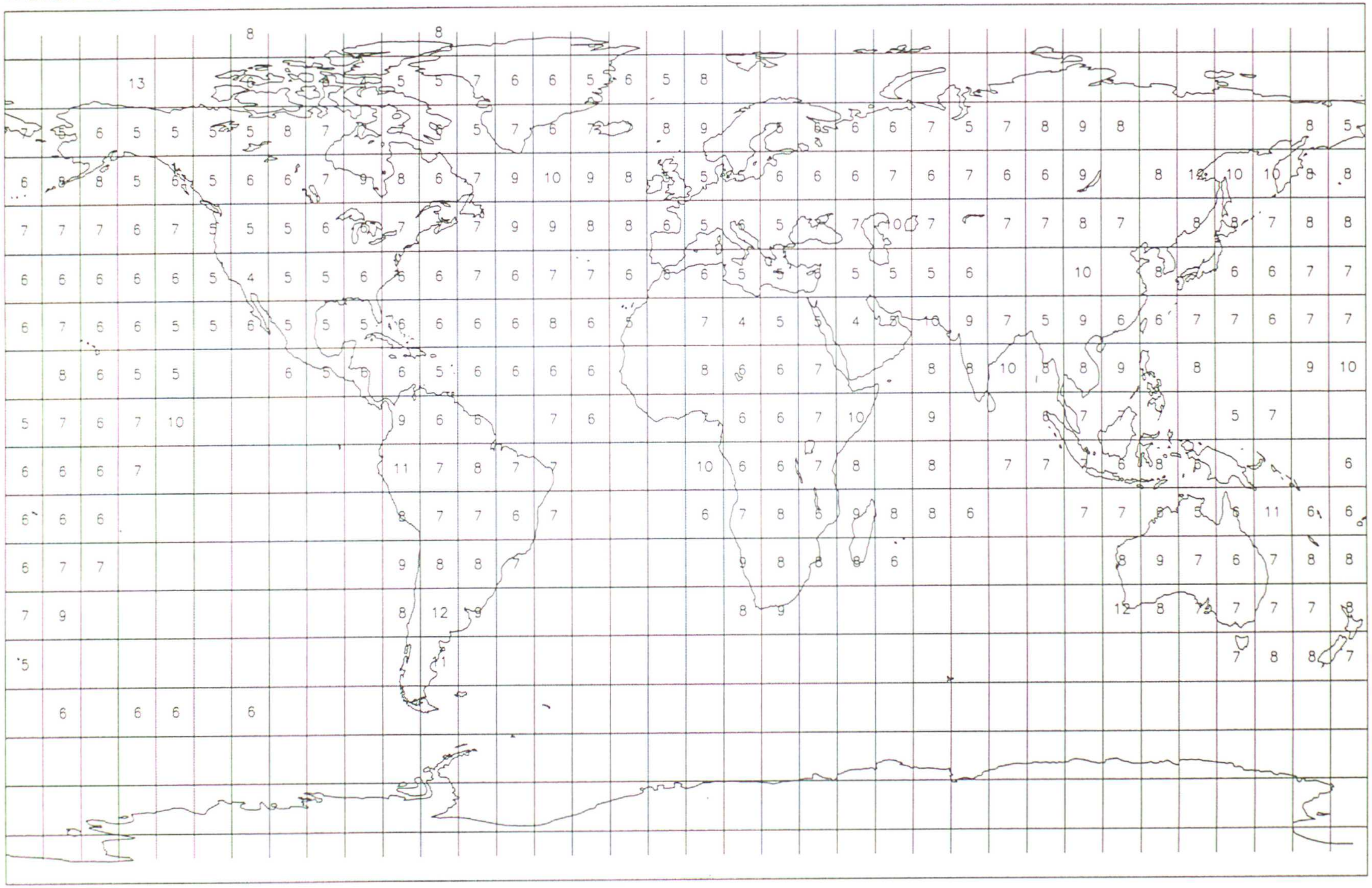


TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
42027	12	Z	1000	34/ 75	20	0	30.7	-43.1	52.9	8
42182	00	Z	150	29/ 77	23	0	45.4	110.0	119.0	5
42182	12	Z	150	29/ 77	26	0	64.1	141.3	155.2	5
42314	00	Z	100	27/ 95	11	0	124.6	53.5	135.6	5
42339	00	Z	150	26/ 73	8	2	58.4	146.4	157.6	7
42339	12	Z	150	26/ 73	10	0	122.8	115.9	168.9	6
42361	00	Z	200	26/ 78	17	1	84.4	43.2	94.8	4
42361	12	Z	100	26/ 78	17	0	147.8	66.4	162.0	4
42369	12	Z	100	27/ 81	17	2	91.2	127.6	156.9	4
42379	12	Z	150	27/ 83	21	0	88.4	86.9	124.0	4
42397	00	Z	150	27/ 88	21	0	97.8	34.1	103.6	7
42647	00	Z	200	23/ 73	13	0	57.9	98.1	113.9	6
42647	12	Z	150	23/ 73	8	2	82.5	159.7	179.8	8
42809	00	Z	150	23/ 88	19	0	84.5	93.7	126.2	5
42809	12	Z	100	23/ 88	19	1	108.3	102.9	149.4	4
42971	00	Z	100	20/ 86	16	1	65.5	121.0	137.6	4
42971	12	Z	100	20/ 86	18	1	115.2	75.3	137.6	4
43003	00	Z	100	19/ 73	18	0	97.8	152.8	181.5	4
43003	12	Z	200	19/ 73	15	9	45.4	175.8	181.6	7
43128	12	Z	100	17/ 78	17	0	90.8	156.2	180.7	4
43185	12	Z	200	16/ 81	22	0	72.7	63.7	96.7	4
43279	12	Z	100	13/ 80	18	1	95.0	106.7	142.8	5
43369	00	Z	100	8/ 73	21	0	85.9	-101.6	133.0	5
43369	12	Z	150	8/ 73	23	0	98.5	-0.4	98.5	4
43371	12	Z	100	8/ 77	21	0	62.7	166.1	177.5	5
53463	12	Z	100	41/ 112	13	0	67.7	138.5	154.2	5
54161	00	Z	100	44/ 125	24	0	31.6	123.2	127.2	4
56294	12	Z	100	31/ 104	25	0	42.2	164.5	169.8	4
56778	00	Z	1000	25/ 103	9	18	2.7	95.6	95.6	4
89642	00	Z	700	-67/ 140	26	1	44.2	4.5	44.4	5
89664	00	Z	400	-78/ 167	24	0	27.0	70.2	75.2	6
97180	00	Z	200	-5/ 120	21	0	97.7	-37.1	104.5	4
97560	00	Z	250	-1/ 136	15	0	60.5	-60.0	85.2	6

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – JULY 1999

FIGURE 8

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1027

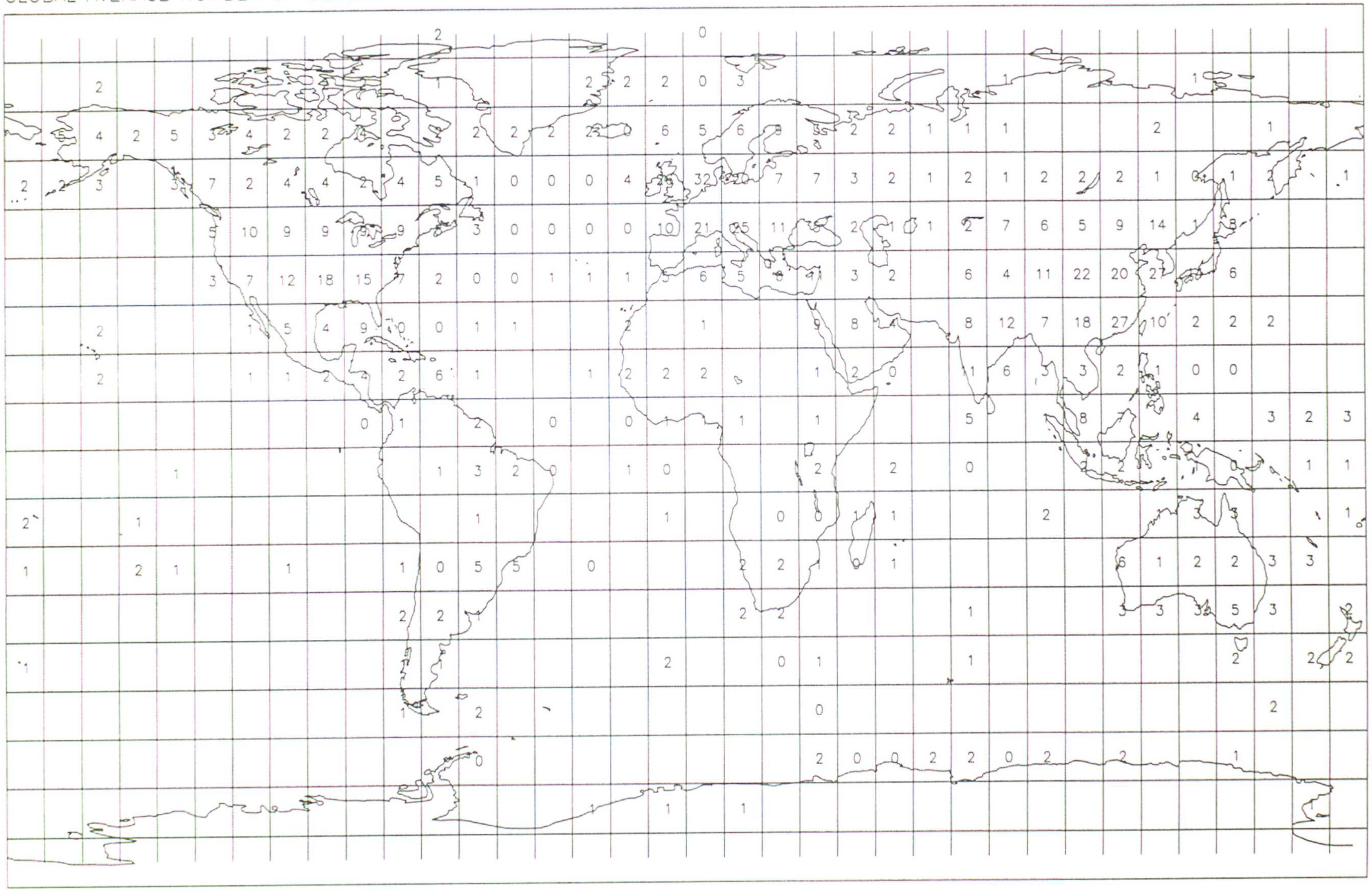

2 0
2 1 2 2 2 0 3 1 1
4 2 5 3 4 2 2 4 2 2 2 2 2 6 5 6 8 5 2 2 1 1 1 2 1
2 2 3 3 7 2 4 4 2 4 5 1 0 0 0 4 32 2 7 7 3 2 1 2 1 2 2 2 1 0 1 2 1
5 10 9 9 9 9 3 0 0 0 0 10 21 35 11 5 2 1 0 1 2 7 6 5 9 14 1 8
3 7 12 18 15 7 2 0 0 1 1 1 5 6 5 8 41 3 2 6 4 11 22 20 21 6
2 1 5 4 9 0 0 1 1 2 1 9 8 4 8 12 7 18 27 10 2 2 2
2 1 1 2 4 2 6 1 1 2 2 2 1 2 0 1 6 3 3 2 1 0 0
0 1 2 0 0 1 1 1 5 8 7 4 3 2 3
1 1 3 2 0 1 0 2 2 0 2 2 0 1 1
2 1 1 1 0 0 1 1 2 3 3 1 1
1 2 1 1 1 0 5 5 0 2 2 1 0 1 6 1 2 2 3 3
2 2 1 2 2 1 3 3 3 5 3 2
1 1 2 0 1 1 2 2 2
1 2 0 2
0 2 0 0 2 2 0 2 2 1
1 1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored		
	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
42339	12	V	250	26/ 73	11	0	100	-3.8	-2.2	15.9	1
43369	00	V	100	8/ 73	21	0	100	15.1	1.9	17.9	1
43369	12	V	100	8/ 73	21	0	100	9.9	2.3	18.7	1
43371	00	V	100	8/ 77	24	0	0	17.0	1.7	17.6	1
48455	12	V	100	14/ 101	10	0	20	19.9	8.7	20.5	1
48568	12	V	150	7/ 101	10	0	30	15.6	10.3	20.7	1
63741	00	V	150	-1/ 37	27	0	18	-12.1	-3.2	15.9	1
76723	00	V	100	19/-111	11	0	18	0.4	-2.5	16.4	1

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – JULY 1999

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1097

FIGURE 9

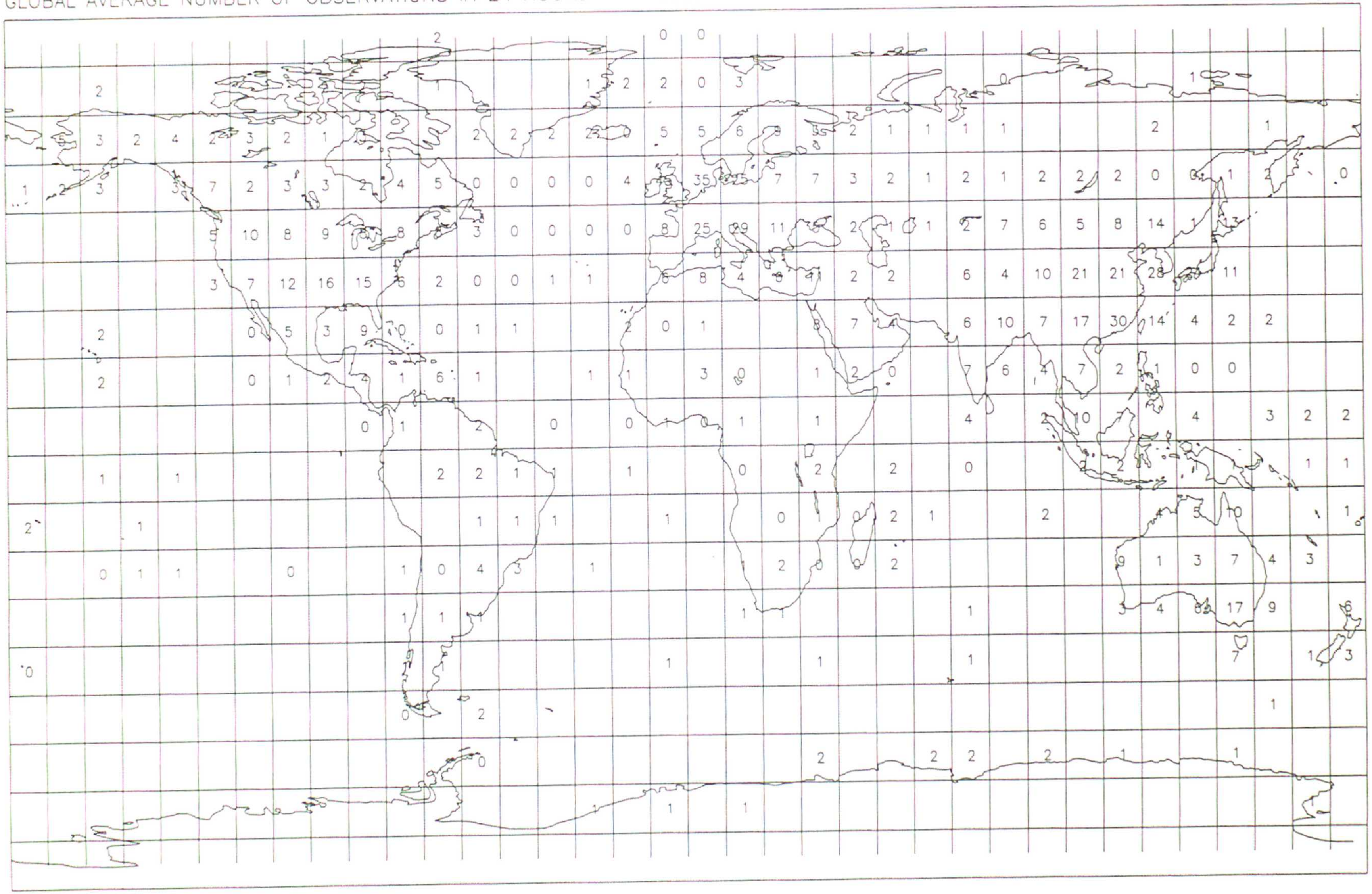

2 0 0
2 1 1 2 2 0 3 0 1
5 3 2 4 2 3 2 1 2 2 2 23 5 5 6 9 55 2 1 1 1 1 2 1
1 2 3 3 7 2 3 3 2 4 5 0 0 0 0 4 35 15 7 7 3 2 1 2 1 2 2 2 0 6 1 2 0
5 10 8 9 8 8 3 0 0 0 0 8 25 29 11 6 2 1 1 1 2 7 6 5 8 14 1 3
3 7 12 16 15 6 2 0 0 1 1 6 8 4 8 41 2 2 6 4 10 21 21 28 11
2 0 5 3 9 0 0 1 1 2 0 1 8 7 6 10 7 17 30 14 4 2 2
2 0 1 2 4 1 6 1 1 1 3 0 1 2 0 7 6 4 7 2 1 0 0
0 1 2 0 0 1 0 1 1 4 2 10 7 4 3 2 2
1 1 2 2 1 1 1 0 2 2 0 2 2 1 1
2 1 1 1 1 1 0 1 0 2 1 2 5 10 1
0 1 1 0 1 0 4 3 1 2 0 0 2 9 1 3 7 4 3
1 1 1 1 1 1 3 4 63 17 9 6
0 1 1 1 7 1 3
0 2 1
0 2 2 2 2 1 1
1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
VNAA	00	DD	-64/ 142	6	10.7	8.9	13.8
17280	00	DD	38/ 40	24	-11.1	3.1	11.3
17280	12	DD	38/ 40	23	-10.7	6.1	10.1
42361	12	DD	26/ 78	12	-11.0	9.7	27.8
43192	12	DD	15/ 74	10	13.8	9.6	18.1
48455	00	DD	14/ 101	18	12.1	9.7	17.8
59758	12	DD	20/ 110	16	10.2	9.4	22.0
62337	00	DD	31/ 34	21	-18.9	3.1	13.3
62337	12	DD	31/ 34	16	-17.8	3.6	13.5
71853	12	DD	50/-100	5	-18.6	8.5	14.0
72201	00	DD	25/ -82	14	12.3	4.7	16.8
78866	12	DD	18/ -63	7	-10.0	9.0	22.5

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

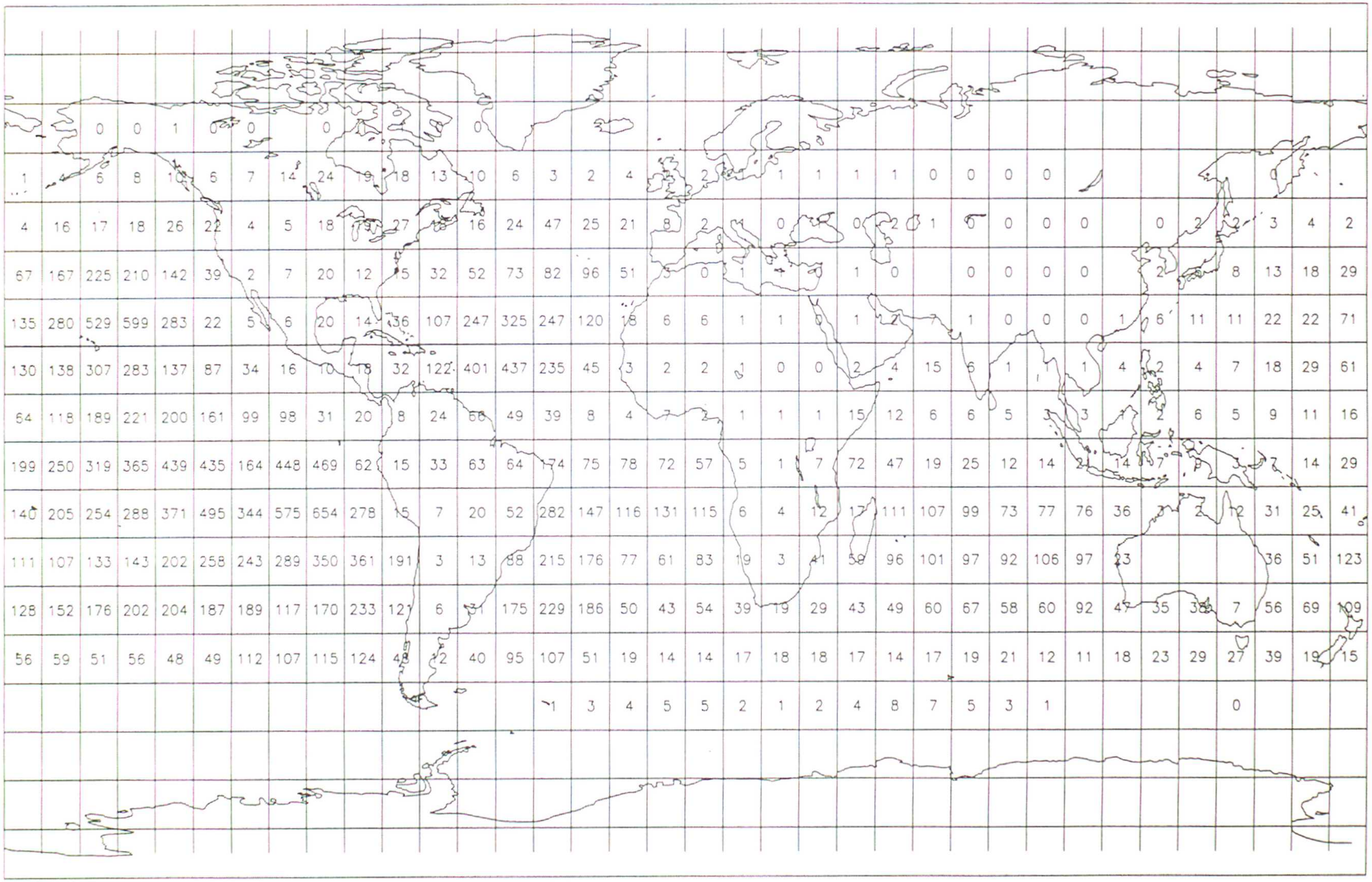
:Mean wind

:Mean observation minus background vector wind differences

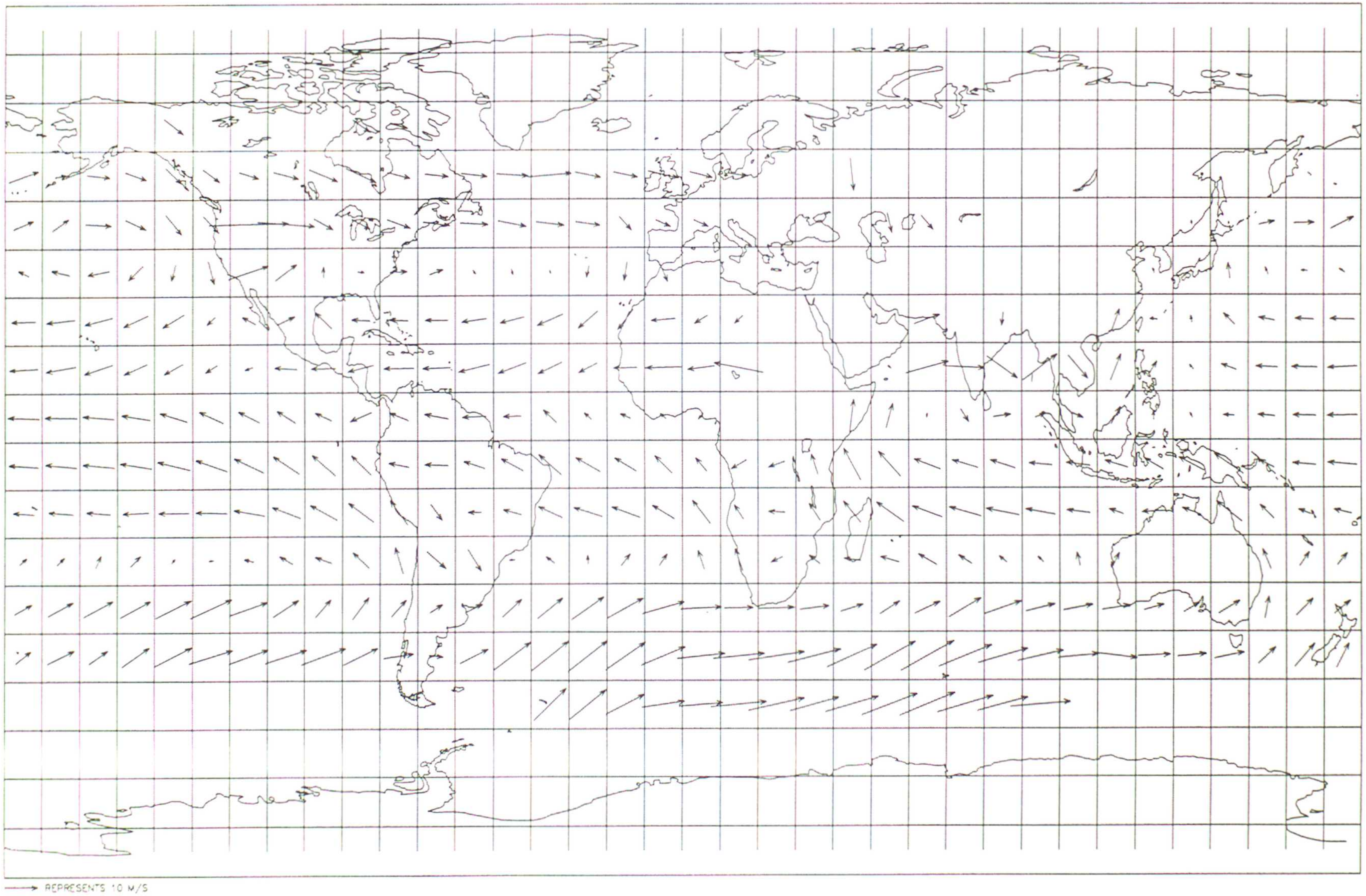
:Mean observation minus background speed differences

:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
JULY 1999


0 0 1 0 0 0 0
1 4 6 8 10 6 7 14 24 19 18 13 10 6 3 2 4 2 1 1 1 1 0 0 0 0 0
4 16 17 18 26 22 4 5 18 19 27 18 16 24 47 25 21 8 2 1 0 1 0 2 1 0 0 0 0 0 2 2 3 4 2
67 167 225 210 142 39 2 7 20 12 15 32 52 73 82 96 51 3 0 1 1 0 1 0 0 0 0 0 2 8 13 18 29
135 280 529 599 283 22 5 6 20 14 36 107 247 325 247 120 18 6 6 1 1 0 1 2 7 1 0 0 0 1 6 11 11 22 22 71
130 138 307 283 137 87 34 16 10 18 32 122 401 437 235 45 3 2 2 1 0 0 2 4 15 6 1 1 1 4 2 4 7 18 29 61
64 118 189 221 200 161 99 98 31 20 8 24 66 49 39 8 4 7 2 1 1 1 15 12 6 6 5 3 3 1 2 6 5 9 11 16
199 250 319 365 439 435 164 448 469 62 15 33 63 64 174 75 78 72 57 5 1 7 72 47 19 25 12 14 21 14 7 8 3 7 14 29
140 205 254 288 371 495 344 575 654 278 15 7 20 52 282 147 116 131 115 6 4 12 17 111 107 99 73 77 76 36 3 2 12 31 25 41
111 107 133 143 202 258 243 289 350 361 191 3 13 88 215 176 77 61 83 19 3 41 58 96 101 97 92 106 97 23 36 51 123
128 152 176 202 204 187 189 117 170 233 121 6 31 175 229 186 50 43 54 39 19 29 43 49 60 67 58 60 92 47 35 38 7 56 69 109
56 59 51 56 48 49 112 107 115 124 48 12 40 95 107 51 19 14 14 17 18 18 17 14 17 19 21 12 11 18 23 29 27 39 19 15
1 3 4 5 5 2 1 2 4 8 7 5 3 1 0

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701–1000 HPA FIGURE 11
JULY 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


→ REPRESENTS 10 M/S

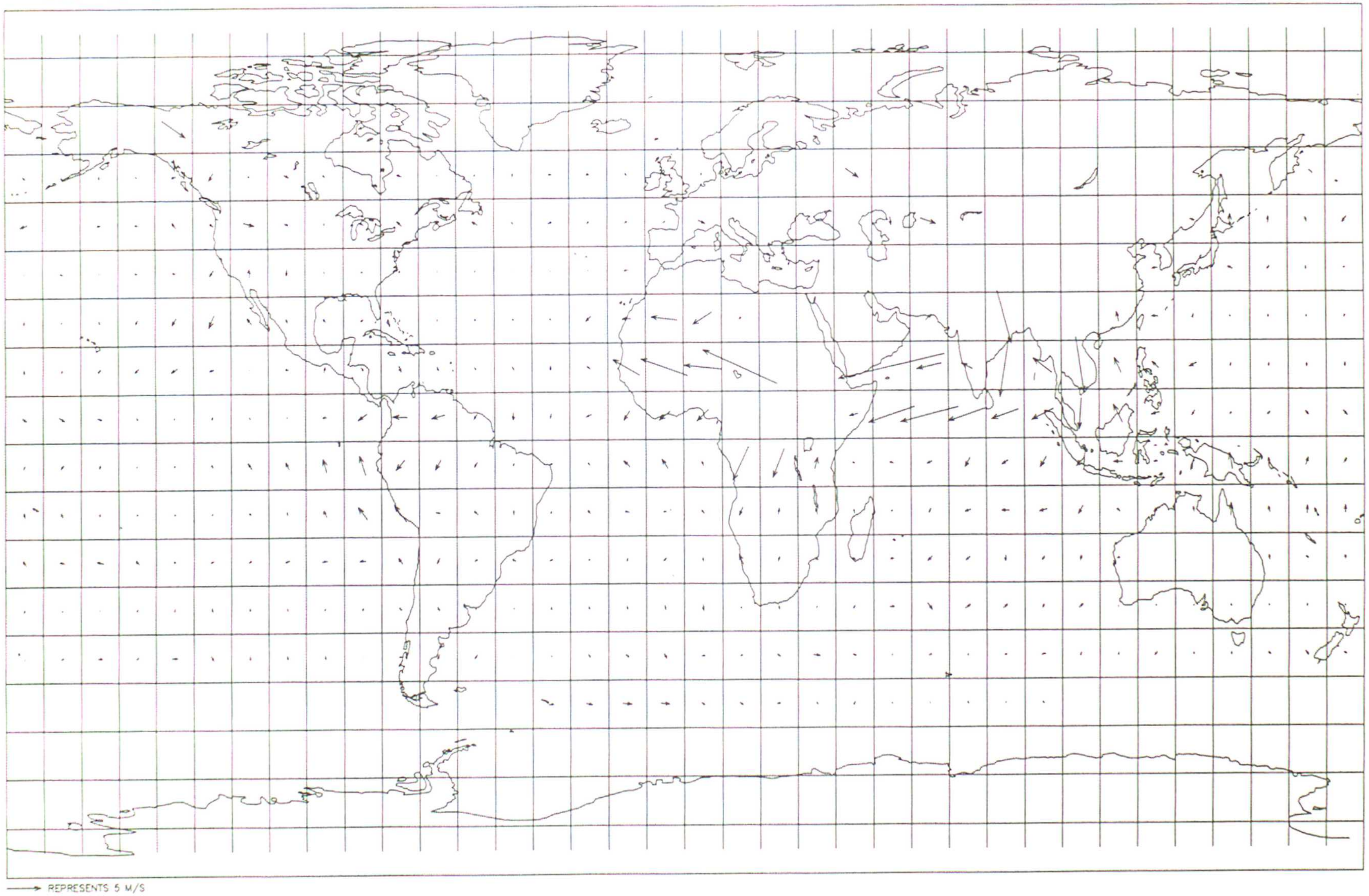
SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 701–1000 HPA

FIGURE 12

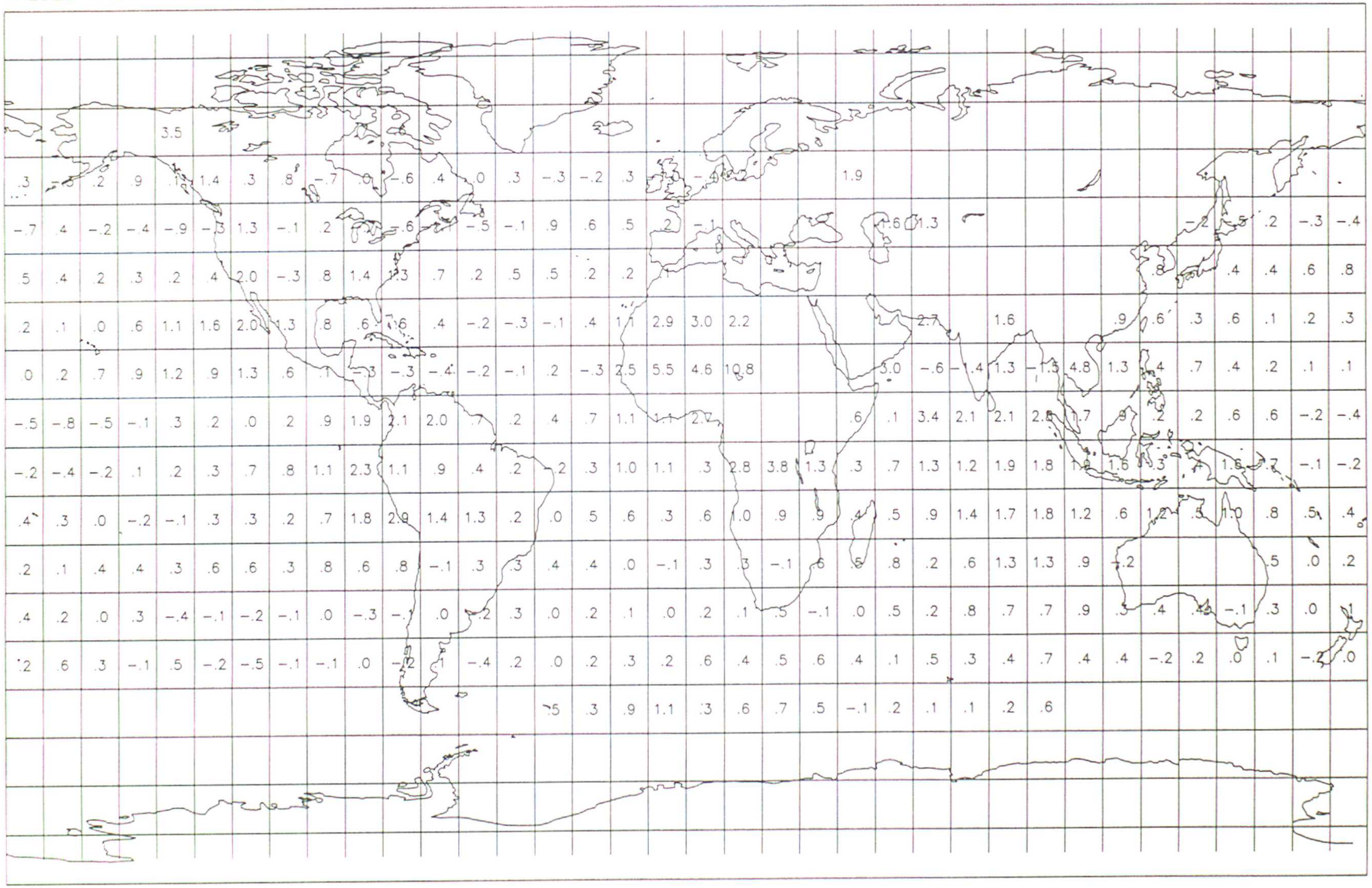
JULY 1999

ALL OBSERVATIONS

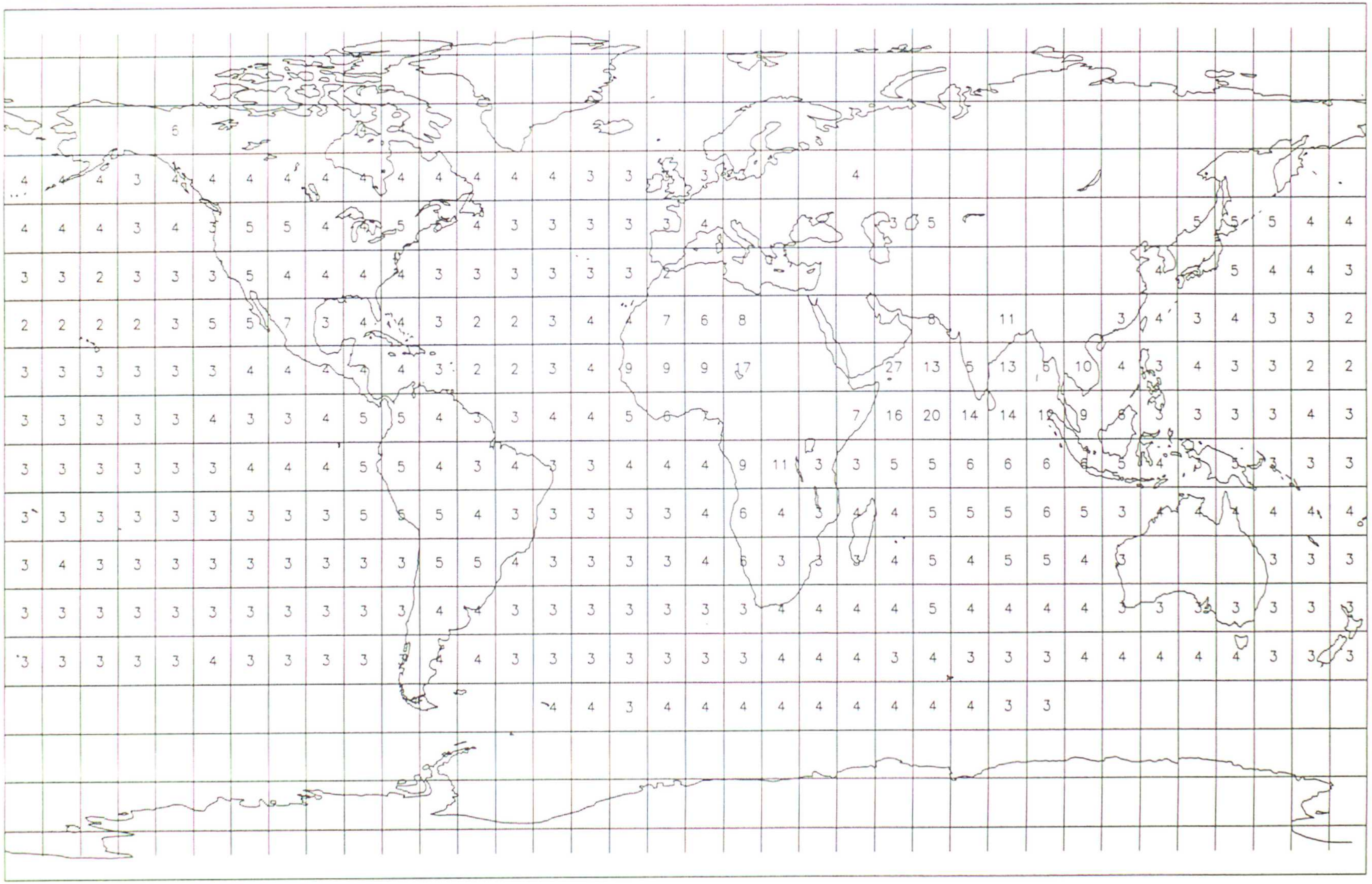
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

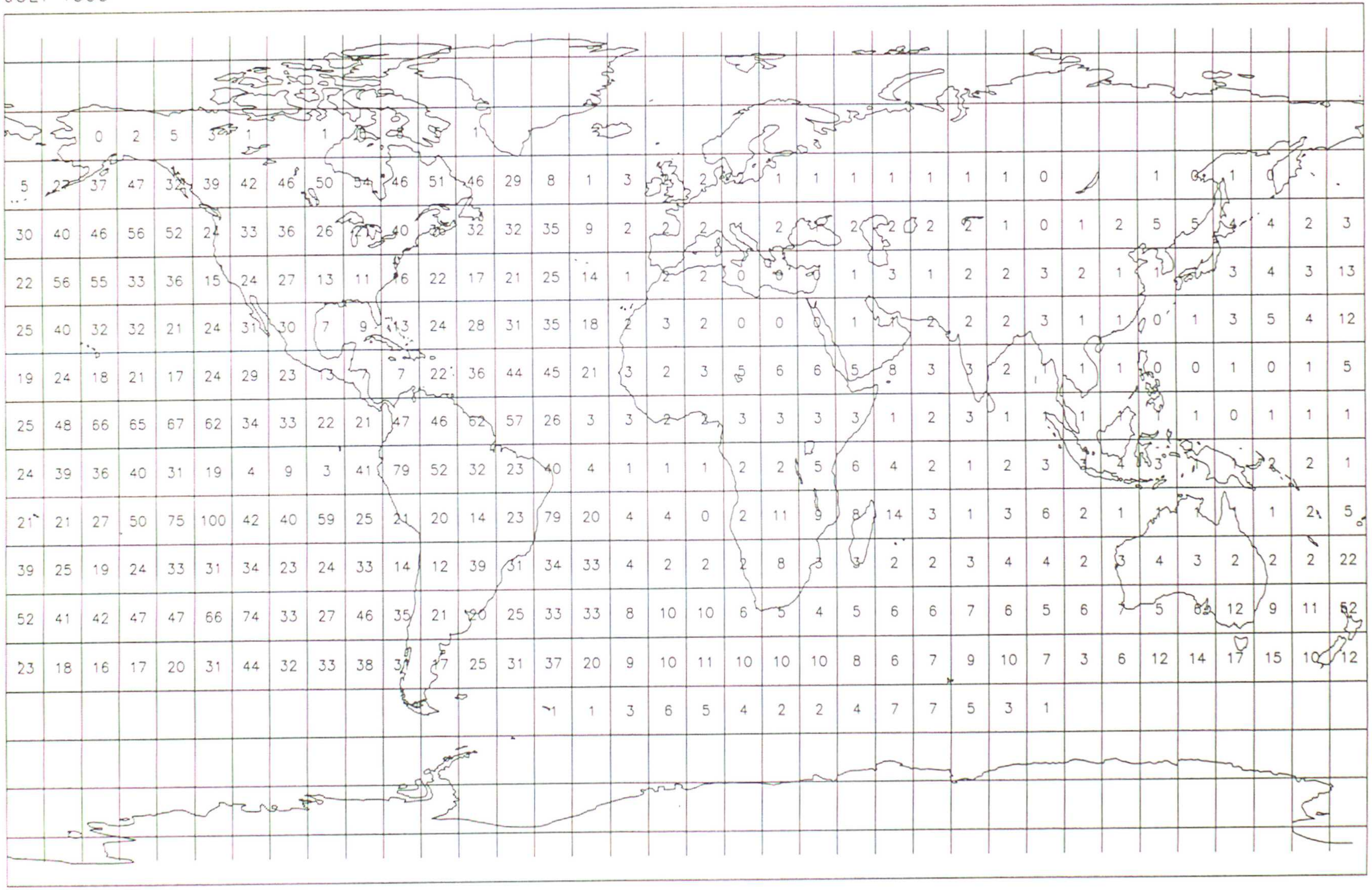
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
JULY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


3.5
.3 –.5 .2 .9 .1 1.4 .3 .8 –.7 .0 –.6 .4 .0 .3 –.3 –.2 .3 –.4 1.9
–.7 .4 –.2 –.4 –.9 –.3 1.3 –.1 .2 –.2 –.6 –.1 –.5 –.1 .9 .6 .5 .2 –.1 1.6 1.3 –.2 –.5 .2 –.3 –.4
.5 .4 .2 .3 .2 .4 2.0 –.3 .8 1.4 1.3 .7 .2 .5 .5 .2 .2 .1 .8 .4 .4 .6 .8
.2 .1 .0 .6 1.1 1.6 2.0 1.3 .8 .6 .6 .4 –.2 –.3 –.1 .4 1.1 2.9 3.0 2.2 2.7 1.6 .9 .6 .3 .6 .1 .2 .3
.0 .2 .7 .9 1.2 .9 1.3 .6 .1 –.3 –.3 –.4 –.2 –.1 .2 –.3 2.5 5.5 4.6 10.8 3.0 –.6 –1.4 1.3 –1.5 4.8 1.3 .4 .7 .4 .2 .1 .1
–.5 –.8 –.5 –.1 .3 .2 .0 .2 .9 1.9 2.1 2.0 .7 .2 .4 .7 1.1 1.1 2.7 .6 .1 3.4 2.1 2.1 2.8 1.7 .9 .2 .2 .6 .6 –.2 –.4
–.2 –.4 –.2 .1 .2 .3 .7 .8 1.1 2.3 1.1 .9 .4 .2 –.2 .3 1.0 1.1 .3 2.8 3.8 1.3 .3 .7 1.3 1.2 1.9 1.8 1.9 1.6 .3 .4 1.6 .7 –.1 –.2
.4 .3 .0 –.2 –.1 .3 .3 .2 .7 1.8 2.9 1.4 1.3 .2 .0 .5 .6 .3 .6 1.0 .9 .9 .4 .5 .9 1.4 1.7 1.8 1.2 .6 1.2 .5 1.0 .8 .5 .4
.2 .1 .4 .4 .3 .6 .6 .3 .8 .6 .8 –.1 .3 .3 .4 .4 .0 –.1 .3 .3 –.1 .6 .5 .8 .2 .6 1.3 1.3 .9 –.2 .5 .0 .2
.4 .2 .0 .3 –.4 –.1 –.2 –.1 .0 –.3 –.1 .0 .2 .3 .0 .2 .1 .0 .2 .1 .5 –.1 .0 .5 .2 .8 .7 .7 .9 .3 .4 .4 –.1 .3 .0 .1
.2 .6 .3 –.1 .5 –.2 –.5 –.1 –.1 .0 –.2 .1 –.4 .2 .0 .2 .3 .2 .6 .4 .5 .6 .4 .1 .5 .3 .4 .7 .4 .4 –.2 .2 .0 .1 –.2 .0
.5 .3 .9 1.1 .3 .6 .7 .5 –.1 .2 .1 .1 .2 .6

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
JULY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


6
4 4 4 3 4 4 4 4 4 4 4 4 4 4 4 3 3 3 4
4 4 4 3 4 3 5 5 4 4 5 4 4 3 3 3 3 3 4 3 5 5 5 5 4 4
3 3 2 3 3 3 5 4 4 4 4 3 3 3 3 3 3 2 4 5 4 4 3
2 2 2 2 3 5 5 7 3 4 4 3 2 2 3 4 4 7 6 8 8 11 3 4 3 4 3 3 2
3 3 3 3 3 3 4 4 4 4 4 3 2 2 3 4 9 9 9 17 27 13 5 13 5 10 4 3 4 3 3 2 2
3 3 3 3 3 4 3 3 4 5 5 4 3 3 4 4 5 6 7 16 20 14 14 12 9 8 3 3 3 3 4 3
3 3 3 3 3 3 4 4 4 5 5 4 3 4 3 3 4 4 4 9 11 3 3 5 5 6 6 6 6 5 4 3 3 3 3
3 3 3 3 3 3 3 3 3 5 5 5 4 3 3 3 3 3 4 6 4 3 4 4 5 5 5 6 5 3 4 4 4 4 4 4
3 4 3 3 3 3 3 3 3 3 3 5 5 4 3 3 3 3 4 6 3 3 3 4 5 4 5 5 4 3 3 3 3
3 3 3 3 3 3 3 3 3 3 3 4 4 3 3 3 3 3 3 3 4 4 4 4 5 4 4 4 4 3 3 3 3 3 3 3
3 3 3 3 3 4 3 3 3 3 4 4 3 3 3 3 3 3 3 4 4 4 3 4 3 3 3 4 4 4 4 4 3 3 3
4 4 3 4 4 4 4 4 4 4 4 4 3 3

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
JULY 1999



		0	2	5	3	1		1	0	8	5	1																							
5	27	37	47	32	39	42	46	50	54	46	51	46	29	8	1	3	2	2	2	1	1	1	1	1	1	1	0			1	0	1	0		
30	40	46	56	52	24	33	36	26	21	40	26	32	32	35	9	2	2	2	1	2	1	2	2	2	2	1	0	1	2	5	5	4	4	2	3
22	56	55	33	36	15	24	27	13	11	16	22	17	21	25	14	1	2	2	0	0	0	1	3	1	2	2	3	2	1	1		3	4	3	13
25	40	32	32	21	24	31	30	7	9	13	24	28	31	35	18	2	3	2	0	0	0	1	1	2	2	2	3	1	1	0	1	3	5	4	12
19	24	18	21	17	24	29	23	13	7	7	22	36	44	45	21	3	2	3	5	6	6	5	8	3	3	2	1	1	1	0	0	1	0	1	5
25	48	66	65	67	62	34	33	22	21	47	46	62	57	26	3	3	2	2	3	3	3	3	1	2	3	1	1	1	1	1	1	0	1	1	1
24	39	36	40	31	19	4	9	3	41	79	52	32	23	40	4	1	1	1	2	2	5	6	4	2	1	2	3	3	4	3	1	1	2	2	1
21	21	27	50	75	100	42	40	59	25	21	20	14	23	79	20	4	4	0	2	11	9	8	14	3	1	3	6	2	1	1	1	1	1	2	5
39	25	19	24	33	31	34	23	24	33	14	12	39	31	34	33	4	2	2	2	8	3	3	2	2	3	4	4	2	3	4	3	2	2	2	22
52	41	42	47	47	66	74	33	27	46	35	21	20	25	33	33	8	10	10	6	5	4	5	6	6	7	6	5	6	7	5	62	12	9	11	52
23	18	16	17	20	31	44	32	33	38	37	17	25	31	37	20	9	10	11	10	10	10	8	6	7	9	10	7	3	6	12	14	17	15	10	12
														1	1	3	6	5	4	2	2	4	7	7	5	3	1								

SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA

JULY 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 16

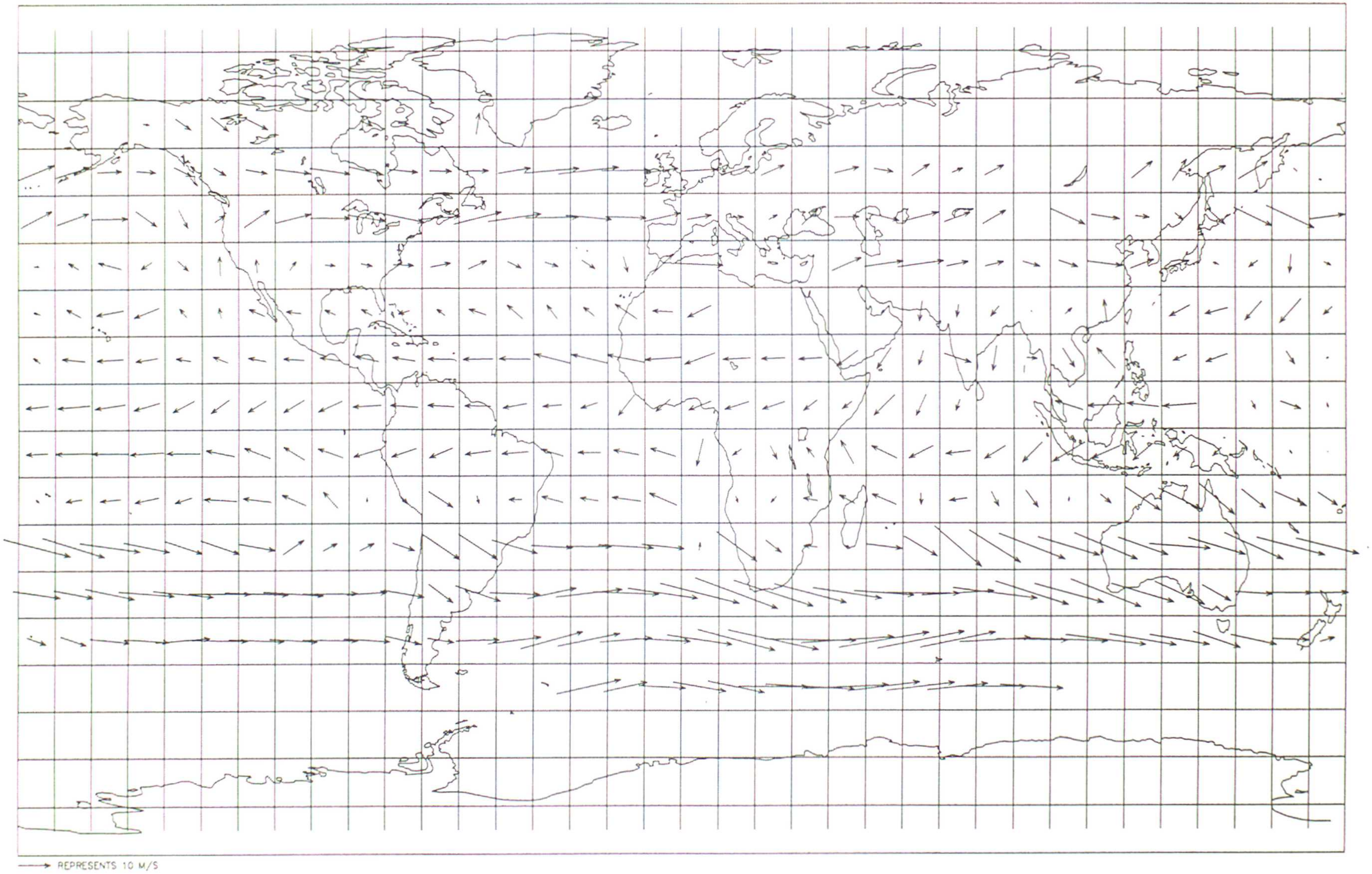
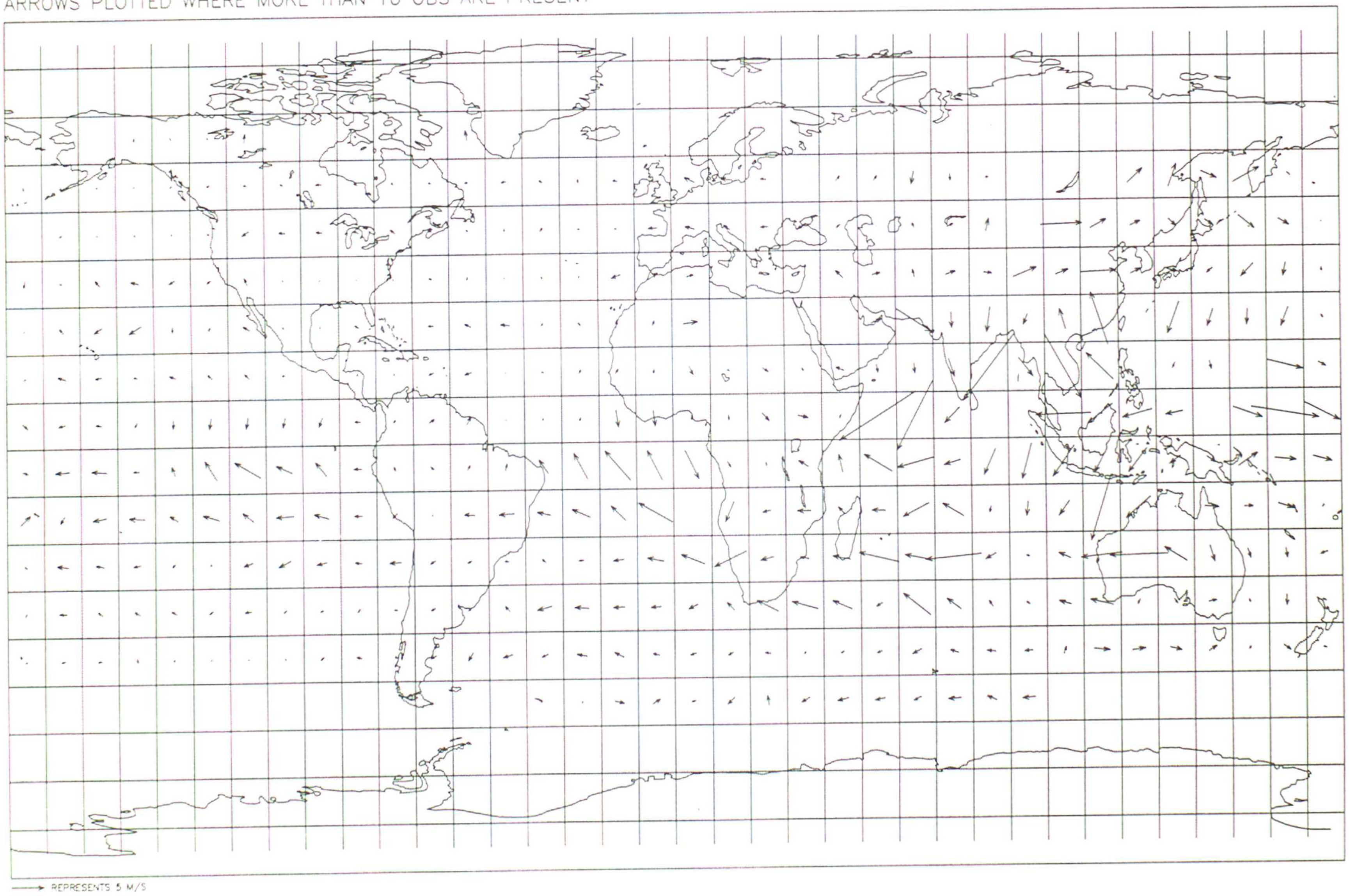
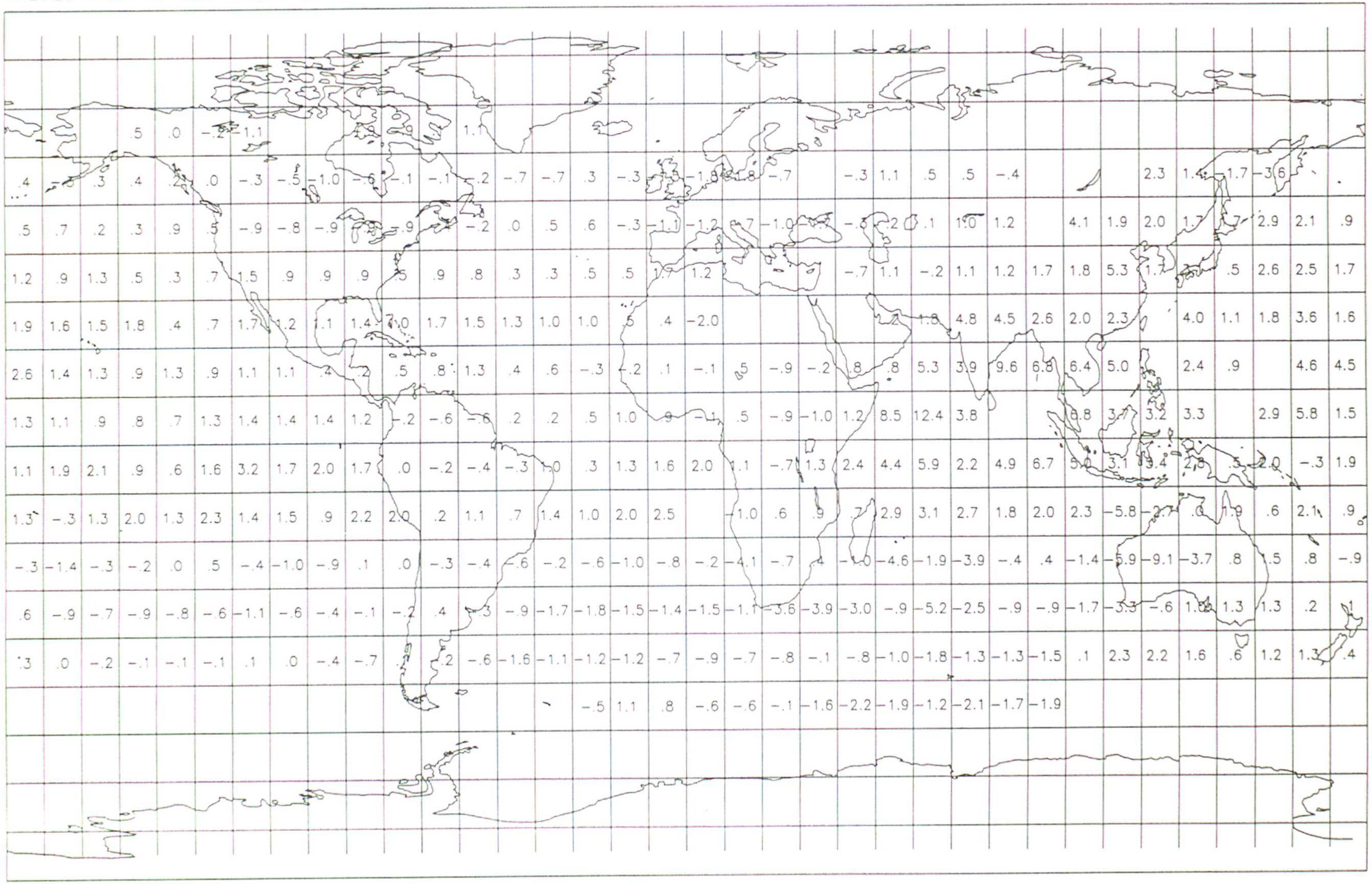

REPRESENTS 10 M/S

FIGURE 17

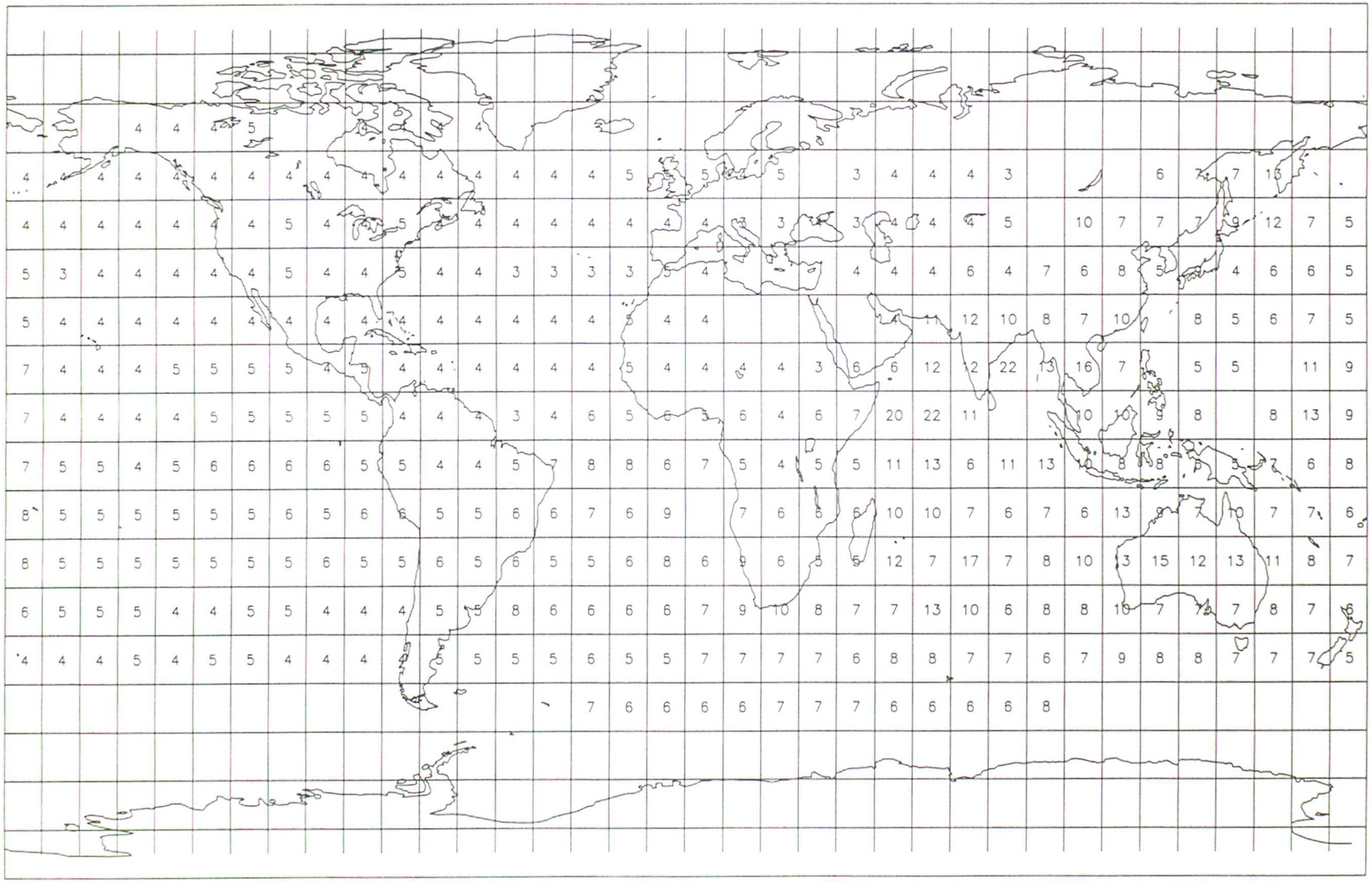
SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 401–700 HPA
JULY 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

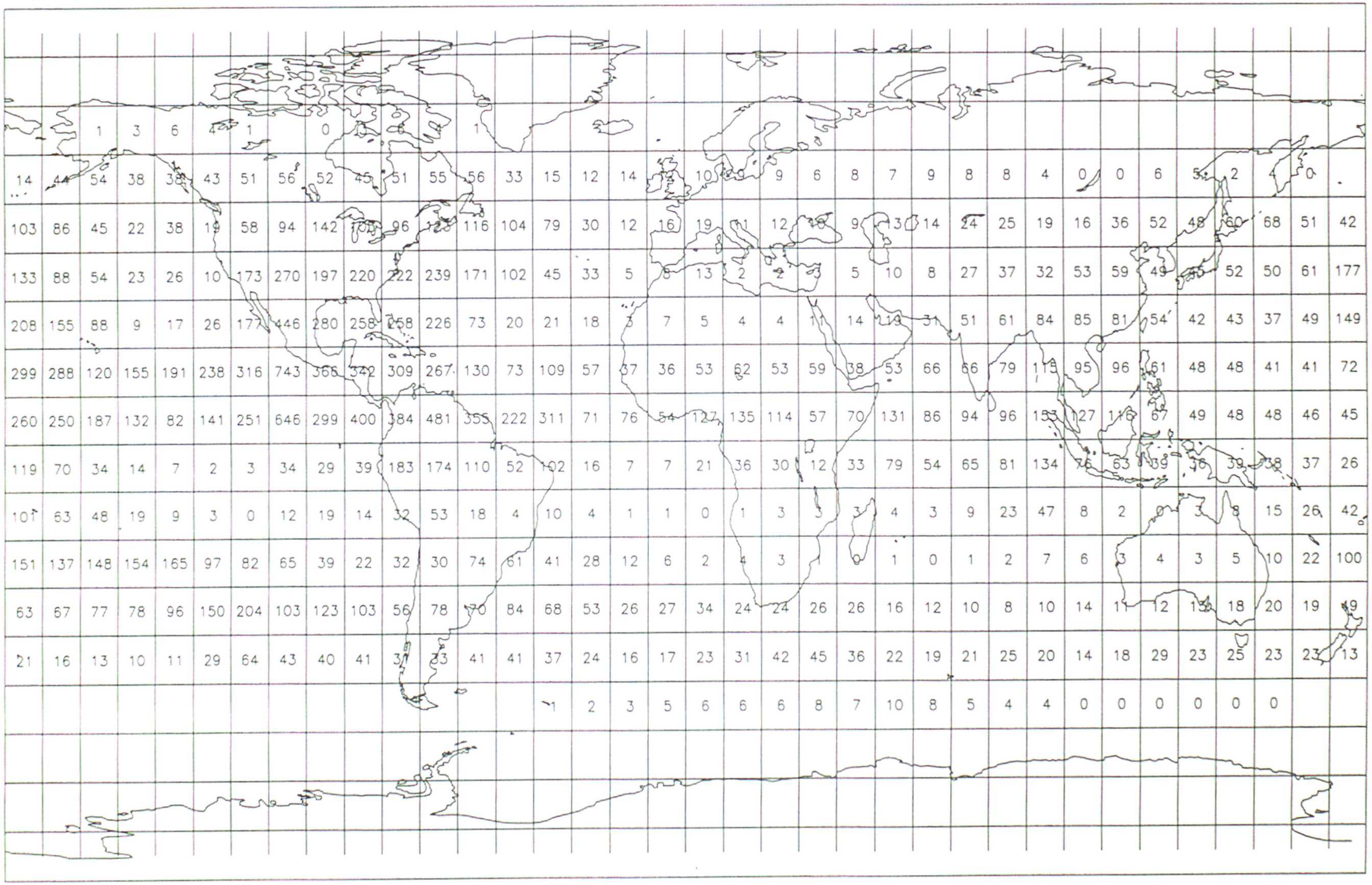
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
JULY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


.5 .0 −.2 −1.1 1.1
.4 −.3 .3 .4 .2 .0 −.3 −.5 −1.0 −.6 −.1 −.1 −.2 −.7 −.7 .3 −.3 −1.8 −1.8 −.7 −.3 1.1 .5 .5 −.4 2.3 1.4 −1.7 −3.6
.5 .7 .2 .3 .9 .5 −.9 −.8 −.9 −.9 −.9 −.2 .0 .5 .6 −.3 −1.1 −1.2 −.7 −1.0 −.7 −.3 −.2 .1 1.0 1.2 4.1 1.9 2.0 1.7 −.7 2.9 2.1 .9
1.2 .9 1.3 .5 .3 .7 1.5 .9 .9 .9 .5 .9 .8 .3 .3 .5 .5 1.7 1.2 −.7 1.1 −.2 1.1 1.2 1.7 1.8 5.3 1.7 .5 2.6 2.5 1.7
1.9 1.6 1.5 1.8 .4 .7 1.7 1.2 1.1 1.4 2.0 1.7 1.5 1.3 1.0 1.0 .5 .4 −2.0 .2 1.8 4.8 4.5 2.6 2.0 2.3 4.0 1.1 1.8 3.6 1.6
2.6 1.4 1.3 .9 1.3 .9 1.1 1.1 .4 .2 .5 .8 1.3 .4 .6 −.3 −.2 .1 −.1 .5 −.9 −.2 .8 .8 5.3 3.9 9.6 6.8 6.4 5.0 2.4 .9 4.6 4.5
1.3 1.1 .9 .8 .7 1.3 1.4 1.4 1.4 1.2 −.2 −.6 −.6 .2 .2 .5 1.0 .9 −.1 .5 −.9 −1.0 1.2 8.5 12.4 3.8 3.8 3.7 3.2 3.3 2.9 5.8 1.5
1.1 1.9 2.1 .9 .6 1.6 3.2 1.7 2.0 1.7 .0 −.2 −.4 −.3 1.0 .3 1.3 1.6 2.0 1.1 −.7 1.3 2.4 4.4 5.9 2.2 4.9 6.7 5.0 3.1 3.4 2.8 .5 −2.0 −.3 1.9
1.3 −.3 1.3 2.0 1.3 2.3 1.4 1.5 .9 2.2 2.0 .2 1.1 .7 1.4 1.0 2.0 2.5 −1.0 .6 .9 .7 2.9 3.1 2.7 1.8 2.0 2.3 −5.8 −2.7 .0 1.9 .6 2.1 .9
−.3 −1.4 −.3 −.2 .0 .5 −.4 −1.0 −.9 .1 .0 −.3 −.4 −.6 −.2 −.6 −1.0 −.8 −.2 −4.1 −.7 .4 −1.0 −4.6 −1.9 −3.9 −.4 .4 −1.4 −5.9 −9.1 −3.7 .8 .5 .8 −.9
.6 −.9 −.7 −.9 −.8 −.6 −1.1 −.6 −.4 −.1 −.2 .4 −.3 −.9 −1.7 −1.8 −1.5 −1.4 −1.5 −1.1 −3.6 −3.9 −3.0 −.9 −5.2 −2.5 −.9 −.9 −1.7 −3.3 −.6 1.8 1.3 1.3 .2 .1
.3 .0 −.2 −.1 −.1 −.1 .1 .0 −.4 −.7 .2 −.6 −1.6 −1.1 −1.2 −1.2 −.7 −.9 −.7 −.8 −.1 −.8 −1.0 −1.8 −1.3 −1.3 −1.5 .1 2.3 2.2 1.6 .6 1.2 1.3 .4
−.5 1.1 .8 −.6 −.6 −.1 −1.6 −2.2 −1.9 −1.2 −2.1 −1.7 −1.9

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
JULY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 4 4 5 4
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 5 3 4 4 4 3 6 7 7 13
4 4 4 4 4 4 4 5 4 5 4 4 4 4 4 4 4 3 3 3 4 4 4 5 10 7 7 7 9 12 7 5
5 3 4 4 4 4 4 5 4 4 5 4 4 3 3 3 3 5 4 4 4 4 6 4 7 6 8 5 4 6 6 5
5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 5 4 4 4 11 12 10 8 7 10 8 5 6 7 5
7 4 4 4 5 5 5 5 4 5 4 4 4 4 4 4 5 4 4 4 4 3 6 6 12 12 22 13 16 7 5 5 11 9
7 4 4 4 4 5 5 5 5 5 4 4 4 3 4 6 5 6 3 6 4 6 7 20 22 11 10 10 9 8 8 13 9
7 5 5 4 5 6 6 6 6 5 5 4 4 5 7 8 8 6 7 5 4 5 5 11 13 6 11 13 10 8 8 5 5 7 6 8
8 5 5 5 5 5 5 6 5 6 6 5 5 6 6 7 6 9 7 6 6 6 10 10 7 6 7 6 13 9 7 10 7 7 6
8 5 5 5 5 5 5 5 6 5 5 6 5 6 5 5 6 8 6 9 6 5 5 12 7 17 7 8 10 13 15 12 13 11 8 7
6 5 5 5 4 4 5 5 4 4 4 5 5 8 6 6 6 6 7 9 10 8 7 7 13 10 6 8 8 10 7 7 7 8 7 6
4 4 4 5 4 5 5 4 4 4 5 5 5 5 6 5 5 7 7 7 7 6 8 8 7 7 6 7 9 8 8 7 7 7 5
7 6 6 6 6 7 7 7 6 6 6 6 8

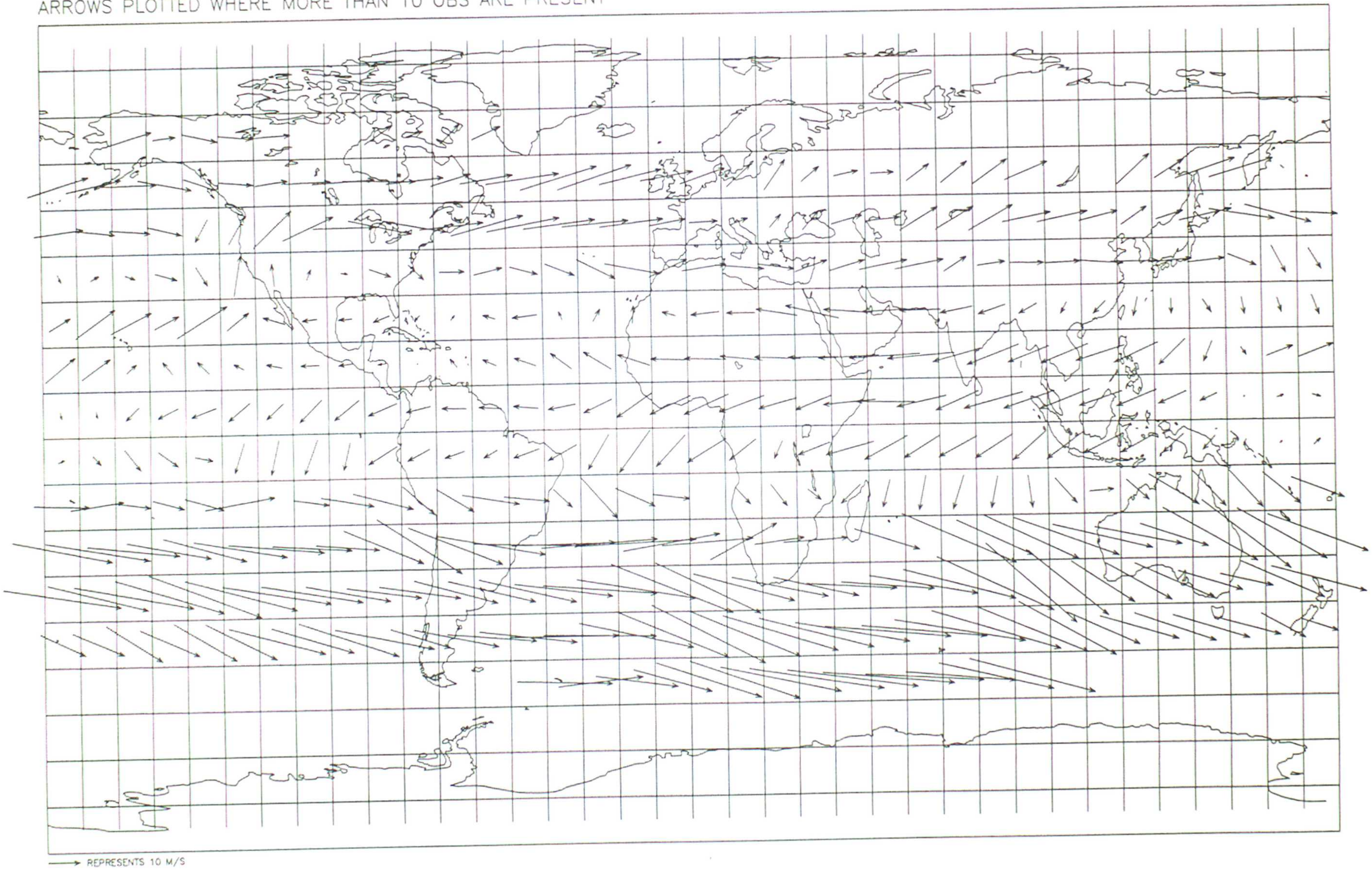
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
JULY 1999



		1	3	6	4	1		0	0	6	4	1																							
14	44	54	38	38	43	51	56	52	45	51	55	56	33	15	12	14	12	10	9	9	6	8	7	9	8	8	4	0	0	6	5	2	4	0	.
103	86	45	22	38	19	58	94	142	100	96	123	116	104	79	30	12	16	19	11	12	18	9	13	14	24	25	19	16	36	52	48	60	68	51	42
133	88	54	23	26	10	173	270	197	220	222	239	171	102	45	33	5	8	13	2	2	3	5	10	8	27	37	32	53	59	49	55	52	50	61	177
208	155	88	9	17	26	177	446	280	258	258	226	73	20	21	18	3	7	5	4	4	11	14	13	31	51	61	84	85	81	54	42	43	37	49	149
299	288	120	155	191	238	316	743	366	342	309	267	130	73	109	57	37	36	53	62	53	59	38	53	66	66	79	115	95	96	61	48	48	41	41	72
260	250	187	132	82	141	251	646	299	400	384	481	355	222	311	71	76	54	127	135	114	57	70	131	86	94	96	153	127	116	67	49	48	48	46	45
119	70	34	14	7	2	3	34	29	39	183	174	110	52	102	16	7	7	21	36	30	12	33	79	54	65	81	134	76	63	39	36	39	38	37	26
101	63	48	19	9	3	0	12	19	14	32	53	18	4	10	4	1	1	0	1	3	3	3	4	3	9	23	47	8	2	0	3	8	15	26	42
151	137	148	154	165	97	82	65	39	22	32	30	74	61	41	28	12	6	2	4	3	1	0	1	0	1	2	7	6	3	4	3	5	10	22	100
63	67	77	78	96	150	204	103	123	103	56	78	70	84	68	53	26	27	34	24	24	26	26	16	12	10	8	10	14	11	12	13	18	20	19	19
21	16	13	10	11	29	64	43	40	41	37	33	41	41	37	24	16	17	23	31	42	45	36	22	19	21	25	20	14	18	29	23	25	23	23	13
														1	2	3	5	6	6	6	8	7	10	8	5	4	4	0	0	0	0	0	0		

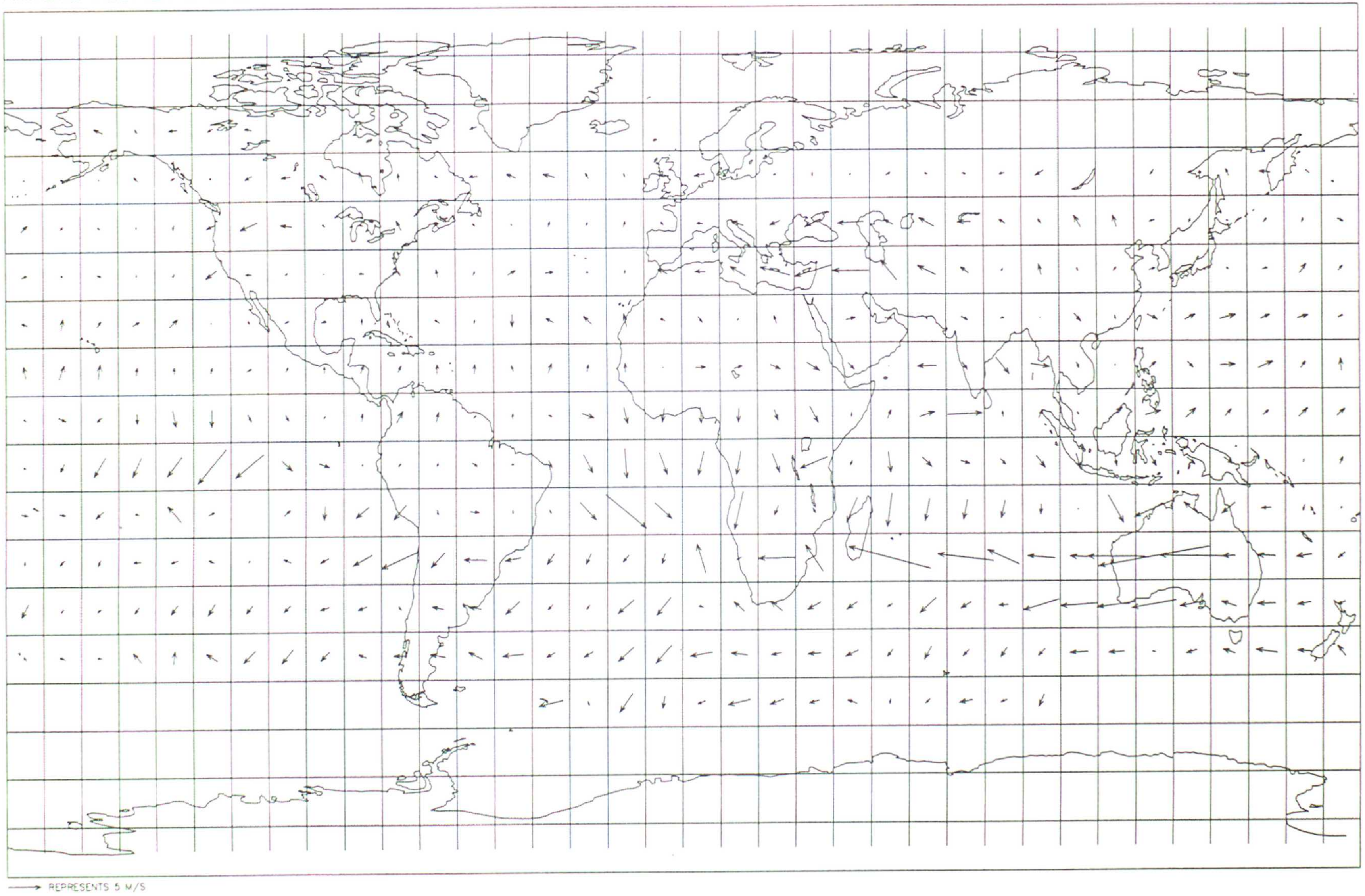
FIGURE 21

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101–400 HPA
JULY 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA
JULY 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 22

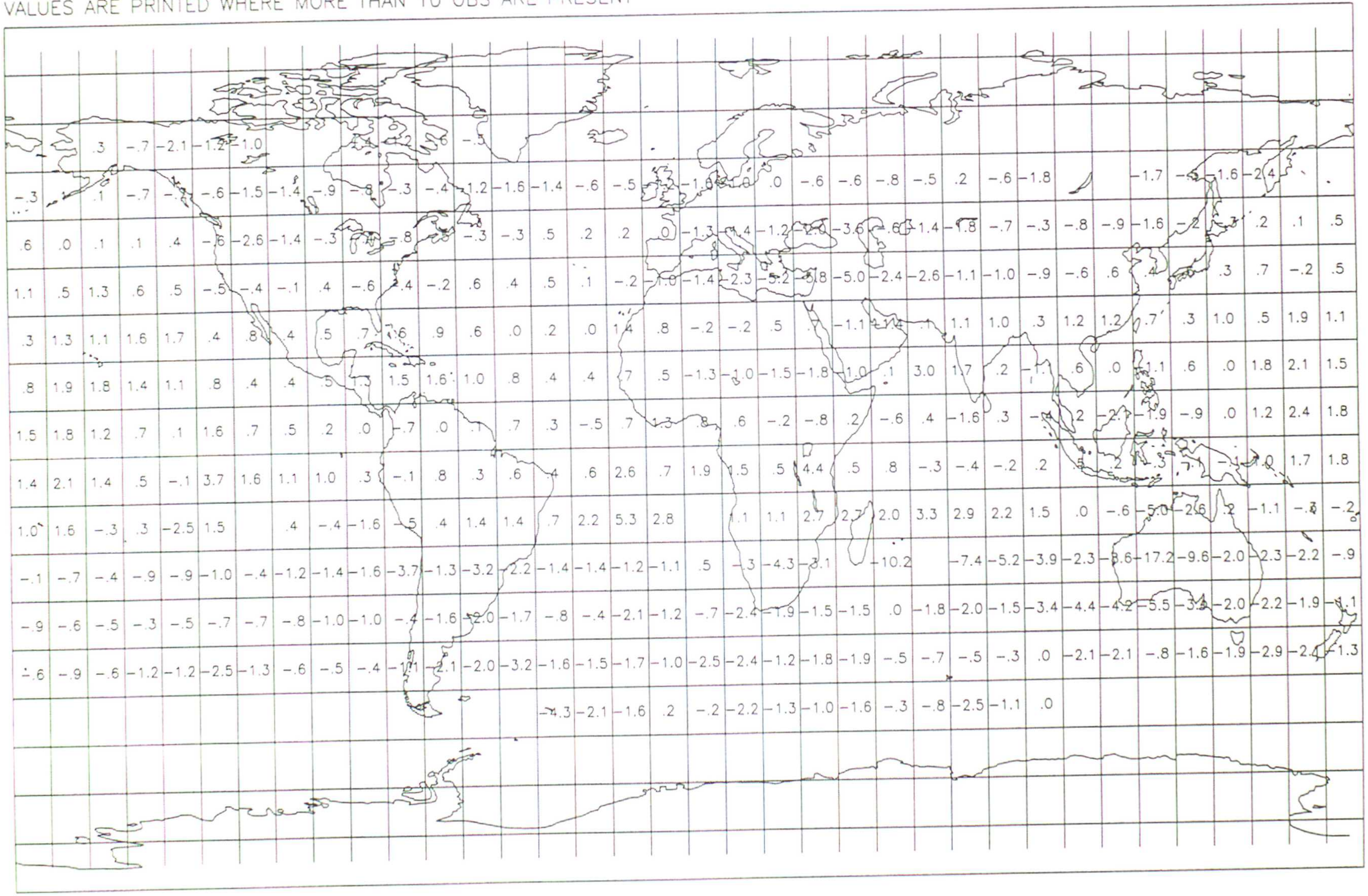

REPRESENTS 5 M/S

SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23

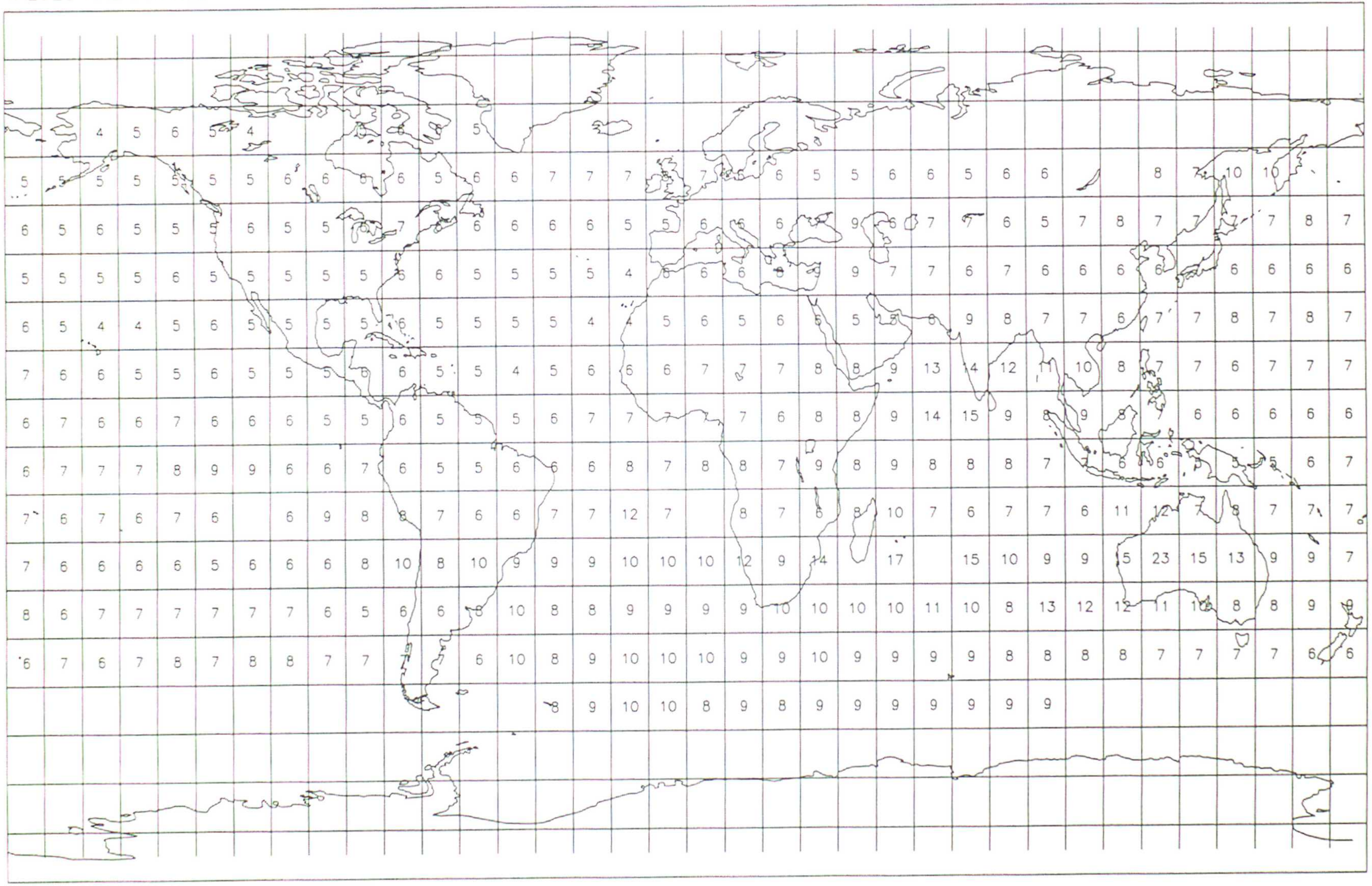
JULY 1999

USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


.3 −.7 −2.1 −1.2 −1.0 −.5
−.3 .1 −.7 −.7 −.6 −1.5 −1.4 −.9 −.8 −.3 −.4 −1.2 −1.6 −1.4 −.6 −.5 −1.6 .0 .0 −.6 −.6 −.8 −.5 .2 −.6 −1.8 −1.7 −.5 −1.6 −2.4
.6 .0 .1 .1 .4 −.6 −2.6 −1.4 −.3 .8 −.3 −.3 .5 .2 .2 .0 −1.3 .4 −1.2 2.0 −3.6 −.6 −1.4 −1.8 −.7 −.3 −.8 −.9 −1.6 −.2 .2 .1 .5
1.1 .5 1.3 .6 .5 −.5 −.4 −.1 .4 −.6 .4 −.2 .6 .4 .5 .1 −.2 −1.0 −1.4 −2.3 −5.2 −5.8 −5.0 −2.4 −2.6 −1.1 −1.0 −.9 −.6 .6 .4 .3 .7 −.2 .5
.3 1.3 1.1 1.6 1.7 .4 .8 .4 .5 .7 .6 .9 .6 .0 .2 .0 1.4 .8 −.2 −.2 .5 .7 −1.1 −1.4 −.1 1.1 1.0 .3 1.2 1.2 .7 .3 1.0 .5 1.9 1.1
.8 1.9 1.8 1.4 1.1 .8 .4 .4 .5 1.3 1.5 1.6 1.0 .8 .4 .4 .7 .5 −1.3 −1.0 −1.5 −1.8 −1.0 .1 3.0 1.7 .2 −1.1 .6 .0 1.1 .6 .0 1.8 2.1 1.5
1.5 1.8 1.2 .7 .1 1.6 .7 .5 .2 .0 −.7 .0 .1 .7 .3 −.5 .7 1.3 .8 .6 −.2 −.8 .2 −.6 .4 −1.6 .3 −.4 .2 −2.1 −1.9 −.9 .0 1.2 2.4 1.8
1.4 2.1 1.4 .5 −.1 3.7 1.6 1.1 1.0 .3 −.1 .8 .3 .6 .4 .6 2.6 .7 1.9 1.5 .5 4.4 .5 .8 −.3 −.4 −.2 .2 .5 .2 1.3 .7 −1.0 1.7 1.8
1.0 1.6 −.3 .3 −2.5 1.5 .4 −.4 −1.6 .5 .4 1.4 1.4 .7 2.2 5.3 2.8 1.1 1.1 2.7 2.7 2.0 3.3 2.9 2.2 1.5 .0 −.6 −5.0 −2.6 .2 −1.1 −.3 −.2
−.1 −.7 −.4 −.9 −.9 −1.0 −.4 −1.2 −1.4 −1.6 −3.7 −1.3 −3.2 −2.2 −1.4 −1.4 −1.2 −1.1 .5 −.3 −4.3 −3.1 −10.2 −7.4 −5.2 −3.9 −2.3 −3.6 −17.2 −9.6 −2.0 −2.3 −2.2 −.9
−.9 −.6 −.5 −.3 −.5 −.7 −.7 −.8 −1.0 −1.0 −.4 −1.6 −2.0 −1.7 −.8 −.4 −2.1 −1.2 −.7 −2.4 −1.9 −1.5 −1.5 .0 −1.8 −2.0 −1.5 −3.4 −4.4 −4.2 −5.5 −3.4 −2.0 −2.2 −1.9 −1.1
−.6 −.9 −.6 −1.2 −1.2 −2.5 −1.3 −.6 −.5 −.4 −1.1 −2.1 −2.0 −3.2 −1.6 −1.5 −1.7 −1.0 −2.5 −2.4 −1.2 −1.8 −1.9 −.5 −.7 −.5 −.3 .0 −2.1 −2.1 −.8 −1.6 −1.9 −2.9 −2.4 −1.3
−4.3 −2.1 −1.6 .2 −.2 −2.2 −1.3 −1.0 −1.6 −.3 −.8 −2.5 −1.1 .0

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
JULY 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 5 6 5 4 5
5 5 5 5 5 5 5 6 6 6 6 5 6 6 7 7 7 7 5 6 5 5 6 6 5 6 6 8 7 10 10
6 5 6 5 5 5 6 5 5 6 7 6 6 6 6 6 5 5 6 6 6 7 9 6 7 7 6 5 7 8 7 7 7 7 8 7
5 5 5 5 6 5 5 5 5 5 6 6 5 5 5 5 4 6 6 6 8 9 9 7 7 6 7 6 6 6 6 6 6 6 6
6 5 4 4 5 6 5 5 5 5 6 5 5 5 5 4 4 5 6 5 6 5 5 5 8 9 8 7 7 6 7 7 8 7 8 7
7 6 6 5 5 6 5 5 5 6 6 5 5 4 5 6 6 6 7 7 7 8 8 9 13 14 12 11 10 8 7 7 6 7 7 7
6 7 6 6 7 6 6 6 5 5 6 5 5 5 6 7 7 7 7 7 6 8 8 9 14 15 9 8 9 8 7 6 6 6 6 6
6 7 7 7 8 9 9 6 6 7 6 5 5 6 6 6 8 7 8 8 7 9 8 9 8 8 8 7 7 6 6 5 5 5 6 7
7 6 7 6 7 6 6 9 8 8 7 6 6 7 7 12 7 8 7 6 8 10 7 6 7 7 6 11 12 7 8 7 7 7
7 6 6 6 6 5 6 6 6 8 10 8 10 9 9 9 10 10 10 12 9 14 17 15 10 9 9 15 23 15 13 9 9 7
8 6 7 7 7 7 7 7 6 5 6 6 8 10 8 8 9 9 9 9 10 10 10 10 11 10 8 13 12 12 11 10 8 8 9 9
6 7 6 7 8 7 8 8 7 7 7 7 6 10 8 9 10 10 10 9 9 10 9 9 9 9 8 8 8 8 7 7 7 7 6 6
8 9 10 10 8 9 8 9 9 9 9 9 9 9

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: July 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :All soundings.

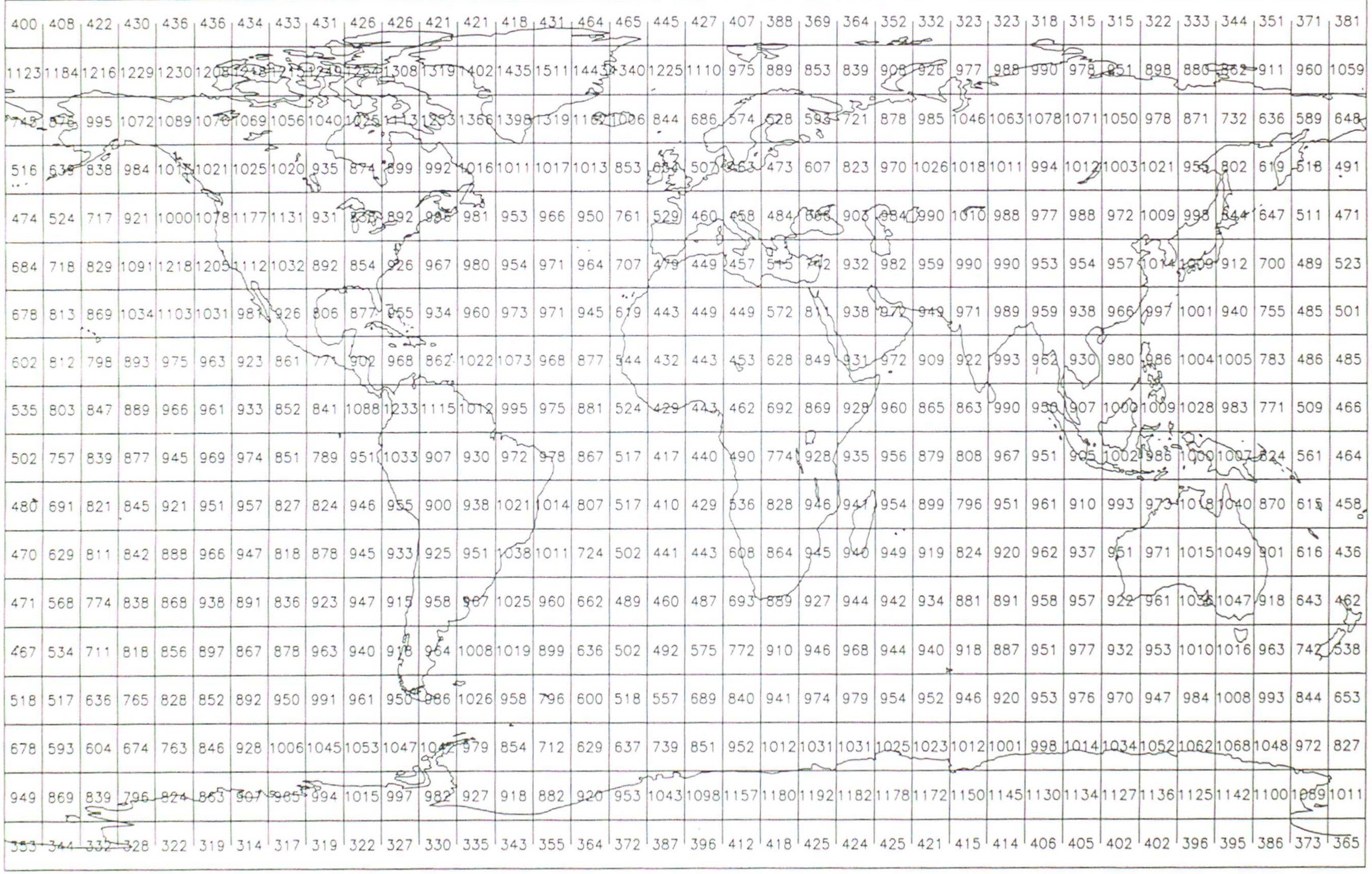
Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

- HIRS8 (Surface)
- HIRS15 (700)
- HIRS11 (500-700)
- HIRS4 (400)
- AMSUA5 (700)
- AMSUA7 (300)
- AMSUA9 (100)

:Mean and standard deviation observation-minus-background brightness temperature differences

ATOVS : MEAN DAILY NUMBER OF OBSERVATIONS
JULY 1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 25



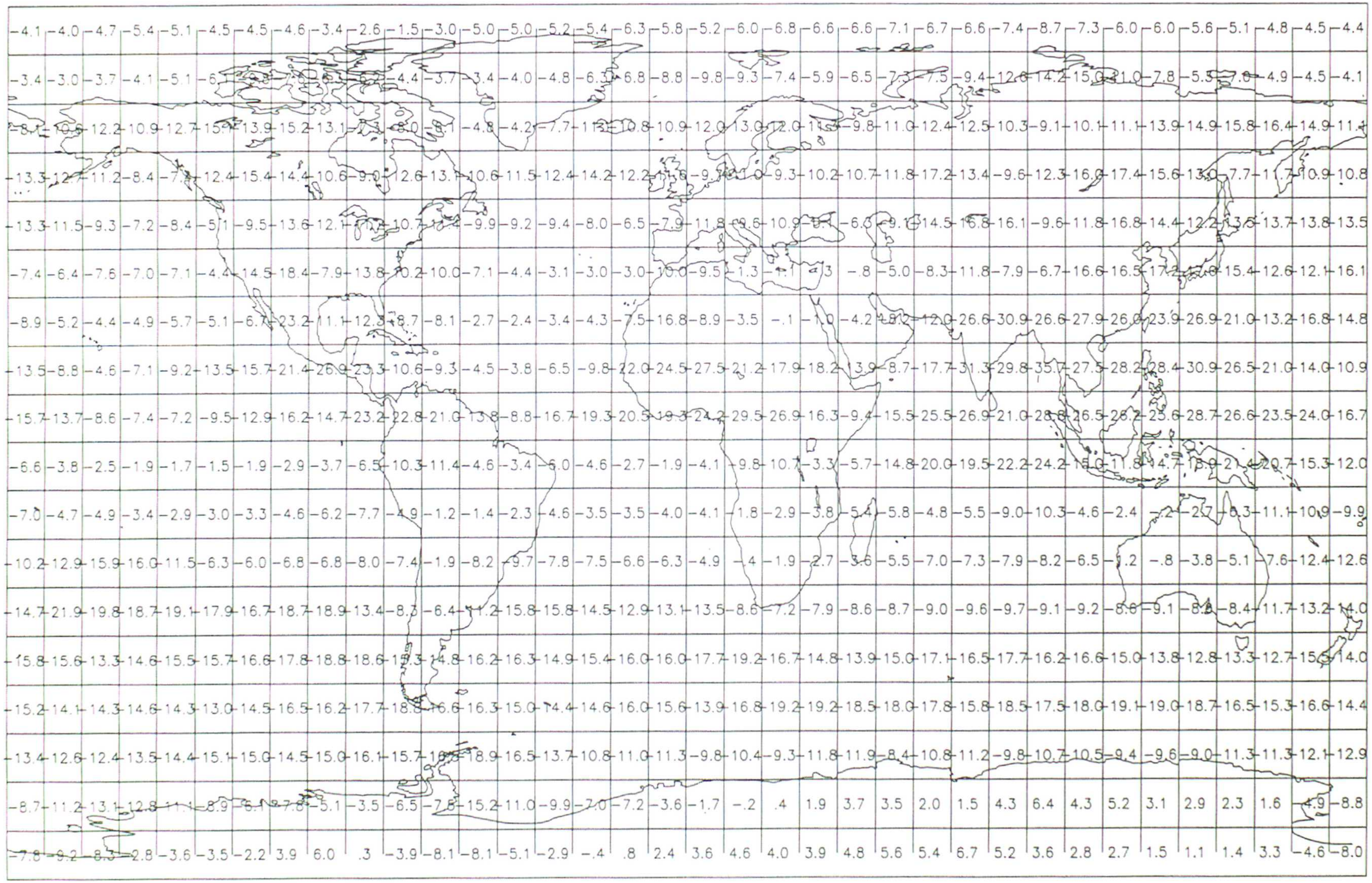
400	408	422	430	436	436	434	433	431	426	426	421	421	418	431	464	465	445	427	407	388	369	364	352	332	323	323	318	315	315	322	333	344	351	371	381
1123	1184	1216	1229	1230	1208	1248	1215	1249	1254	1308	1319	1402	1435	1511	1443	1340	1225	1110	975	889	853	839	908	926	977	988	990	978	951	898	880	862	911	960	1059
745	876	995	1072	1089	1076	1069	1056	1040	1025	1113	1253	1366	1398	1319	1162	1006	844	686	574	628	593	721	878	985	1046	1063	1078	1071	1050	978	871	732	636	589	648
516	639	838	984	1015	1021	1025	1020	935	874	899	992	1016	1011	1017	1013	853	634	507	853	473	607	823	970	1026	1018	1011	994	1012	1003	1021	955	802	619	518	491
474	524	717	921	1000	1078	1177	1131	931	838	892	986	981	953	966	950	761	529	460	458	484	666	903	984	990	1010	988	977	988	972	1009	998	844	647	511	471
684	718	829	1091	1218	1205	1112	1032	892	854	926	967	980	954	971	964	707	479	449	457	515	742	932	982	959	990	990	953	954	957	1014	1009	912	700	489	523
678	813	869	1034	1103	1031	981	926	806	877	955	934	960	973	971	945	619	443	449	449	572	811	938	972	949	971	989	959	938	966	997	1001	940	755	485	501
602	812	798	893	975	963	923	861	771	902	968	862	1022	1073	968	877	544	432	443	453	628	849	931	972	909	922	993	962	930	980	986	1004	1005	783	486	485
535	803	847	889	966	961	933	852	841	1088	1233	1115	1012	995	975	881	524	429	443	462	692	869	928	960	865	863	990	950	907	1000	1009	1028	983	771	509	466
502	757	839	877	945	969	974	851	789	951	1033	907	930	972	978	867	517	417	440	490	774	928	935	956	879	808	967	951	905	1002	986	1000	1007	824	561	464
480	691	821	845	921	951	957	827	824	946	955	900	938	1021	1014	807	517	410	429	536	828	946	941	954	899	796	951	961	910	993	973	1018	1040	870	615	458
470	629	811	842	888	966	947	818	878	945	933	925	951	1038	1011	724	502	441	443	608	864	945	940	949	919	824	920	962	937	951	971	1015	1049	901	616	436
471	568	774	838	868	938	891	836	923	947	915	958	967	1025	960	662	489	460	487	693	889	927	944	942	934	881	891	958	957	922	961	1036	1047	918	643	462
467	534	711	818	856	897	867	878	963	940	918	964	1008	1019	899	636	502	492	575	772	910	946	968	944	940	918	887	951	977	932	953	1010	1016	963	742	538
518	517	636	765	828	852	892	950	991	961	950	986	1026	958	796	600	518	557	689	840	941	974	979	954	952	946	920	953	976	970	947	984	1008	993	844	653
678	593	604	674	763	846	928	1006	1045	1053	1047	1042	979	854	712	629	637	739	851	952	1012	1031	1031	1025	1023	1012	1001	998	1014	1034	1052	1062	1068	1048	972	827
949	869	839	796	824	863	907	965	994	1015	997	982	927	918	882	920	953	1043	1098	1157	1180	1192	1182	1178	1172	1150	1145	1130	1134	1127	1136	1125	1142	1100	1089	1011
353	344	332	328	322	319	314	317	319	322	327	330	335	343	355	364	372	387	396	412	418	425	424	425	421	415	414	406	405	402	402	396	395	386	373	365

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)

JULY 1999 : HIRS8 channel (Surface)

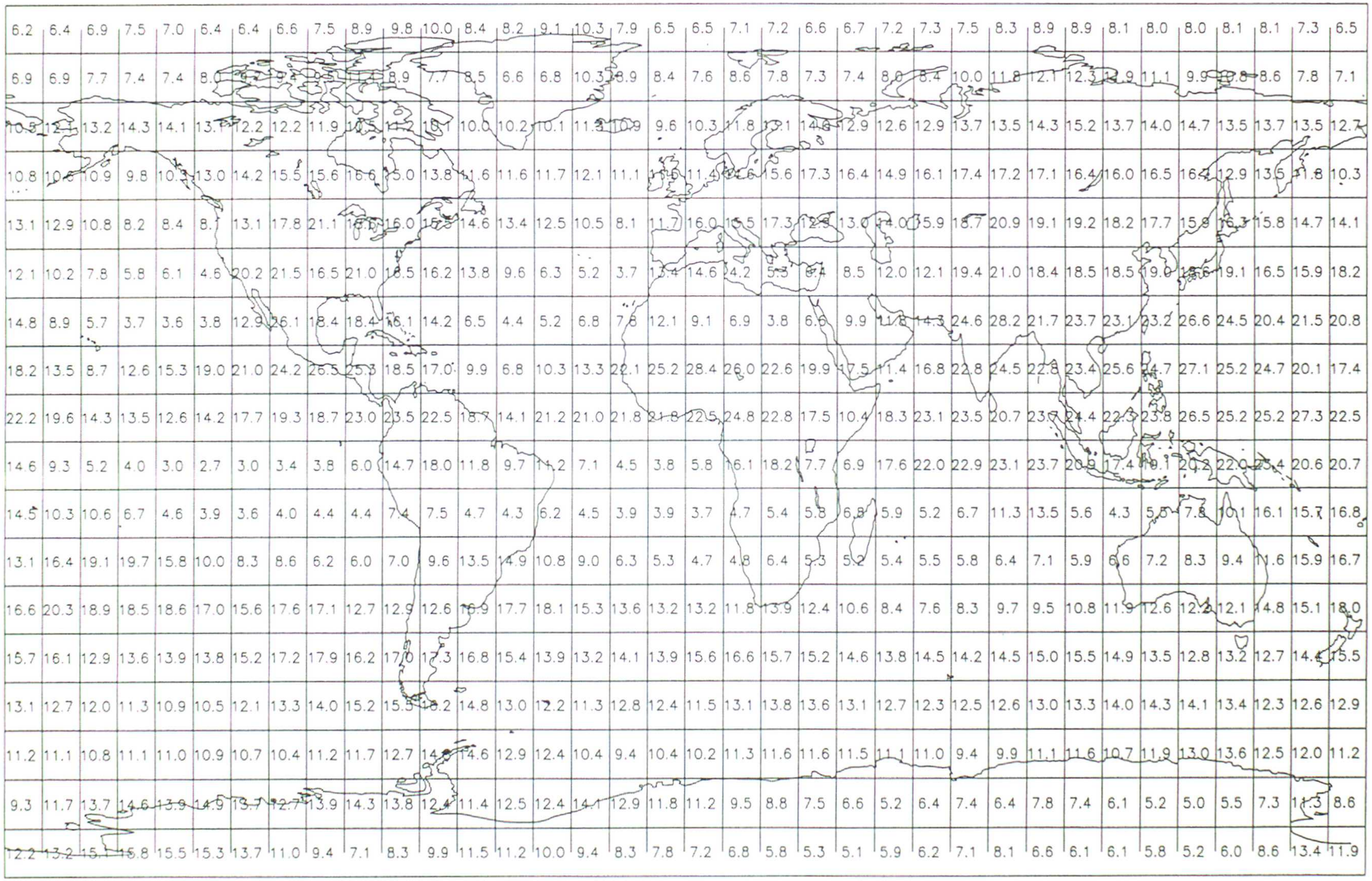
NOAA–15, USING ALL OBSERVATIONS

FIGURE 26


-4.1 -4.0 -4.7 -5.4 -5.1 -4.5 -4.5 -4.6 -3.4 -2.6 -1.5 -3.0 -5.0 -5.0 -5.2 -5.4 -6.3 -5.8 -5.2 -6.0 -6.8 -6.6 -6.6 -7.1 -6.7 -6.6 -7.4 -8.7 -7.3 -6.0 -6.0 -5.6 -5.1 -4.8 -4.5 -4.4
-3.4 -3.0 -3.7 -4.1 -5.1 -6.1 -9.8 -7.6 -6.6 -6.7 -4.4 -3.7 -3.4 -4.0 -4.8 -6.3 -6.8 -8.8 -9.8 -9.3 -7.4 -5.9 -6.5 -7.3 -7.5 -9.4 -12.6 -14.2 -15.0 -21.0 -7.8 -5.5 -7.0 -4.9 -4.5 -4.1
-8.1 -10.6 -12.2 -10.9 -12.7 -15.1 -13.9 -15.2 -13.1 -7.3 -8.0 -8.1 -4.8 -4.2 -7.7 -11.3 -10.8 -10.9 -12.0 -13.0 -12.0 -11.3 -9.8 -11.0 -12.4 -12.5 -10.3 -9.1 -10.1 -11.1 -13.9 -14.9 -15.8 -16.4 -14.9 -11.4
-13.3 -12.7 -11.2 -8.4 -7.3 -12.4 -15.4 -14.4 -10.6 -9.0 -12.6 -13.1 -10.6 -11.5 -12.4 -14.2 -12.2 -11.6 -9.7 -11.0 -9.3 -10.2 -10.7 -11.8 -17.2 -13.4 -9.6 -12.3 -16.0 -17.4 -15.6 -13.0 -7.7 -11.7 -10.9 -10.8
-13.3 -11.5 -9.3 -7.2 -8.4 -5.1 -9.5 -13.6 -12.1 -11.2 -10.7 -11.4 -9.9 -9.2 -9.4 -8.0 -6.5 -7.9 -11.8 -9.6 -10.9 -8.1 -6.3 -9.1 -14.5 -16.8 -16.1 -9.6 -11.8 -16.8 -14.4 -12.2 -13.5 -13.7 -13.8 -13.5
-7.4 -6.4 -7.6 -7.0 -7.1 -4.4 -14.5 -18.4 -7.9 -13.8 -10.2 -10.0 -7.1 -4.4 -3.1 -3.0 -3.0 -10.0 -9.5 -1.3 -1.1 -.3 -.8 -5.0 -8.3 -11.8 -7.9 -6.7 -16.6 -16.5 -17.2 -17.0 -15.4 -12.6 -12.1 -16.1
-8.9 -5.2 -4.4 -4.9 -5.7 -5.1 -6.7 -23.2 -11.1 -12.3 -8.7 -8.1 -2.7 -2.4 -3.4 -4.3 -7.5 -16.8 -8.9 -3.5 -.1 -1.0 -4.2 -8.2 -12.0 -26.6 -30.9 -26.6 -27.9 -26.0 -23.9 -26.9 -21.0 -13.2 -16.8 -14.8
-13.5 -8.8 -4.6 -7.1 -9.2 -13.5 -15.7 -21.4 -26.9 -23.3 -10.6 -9.3 -4.5 -3.8 -6.5 -9.8 -22.0 -24.5 -27.5 -21.2 -17.9 -18.2 -13.9 -8.7 -17.7 -31.3 -29.8 -35.7 -27.5 -28.2 -28.4 -30.9 -26.5 -21.0 -14.0 -10.9
-15.7 -13.7 -8.6 -7.4 -7.2 -9.5 -12.9 -16.2 -14.7 -23.2 -22.8 -21.0 -13.8 -8.8 -16.7 -19.3 -20.5 -19.3 -24.2 -29.5 -26.9 -16.3 -9.4 -15.5 -25.5 -26.9 -21.0 -28.8 -26.5 -28.2 -25.6 -28.7 -26.6 -23.5 -24.0 -16.7
-6.6 -3.8 -2.5 -1.9 -1.7 -1.5 -1.9 -2.9 -3.7 -6.5 -10.3 -11.4 -4.6 -3.4 -6.0 -4.6 -2.7 -1.9 -4.1 -9.8 -10.7 -3.3 -5.7 -14.8 -20.0 -19.5 -22.2 -24.2 -15.0 -11.8 -14.7 -13.9 -21.4 -20.7 -15.3 -12.0
-7.0 -4.7 -4.9 -3.4 -2.9 -3.0 -3.3 -4.6 -6.2 -7.7 -4.9 -1.2 -1.4 -2.3 -4.6 -3.5 -3.5 -4.0 -4.1 -1.8 -2.9 -3.8 -5.4 -5.8 -4.8 -5.5 -9.0 -10.3 -4.6 -2.4 -.2 -2.7 -6.3 -11.1 -10.9 -9.9
-10.2 -12.9 -15.9 -16.0 -11.5 -6.3 -6.0 -6.8 -6.8 -8.0 -7.4 -1.9 -8.2 -9.7 -7.8 -7.5 -6.6 -6.3 -4.9 -.4 -1.9 -2.7 -3.6 -5.5 -7.0 -7.3 -7.9 -8.2 -6.5 -1.2 -.8 -3.8 -5.1 -7.6 -12.4 -12.6
-14.7 -21.9 -19.8 -18.7 -19.1 -17.9 -16.7 -18.7 -18.9 -13.4 -8.3 -6.4 -11.2 -15.8 -15.8 -14.5 -12.9 -13.1 -13.5 -8.6 -7.2 -7.9 -8.6 -8.7 -9.0 -9.6 -9.7 -9.1 -9.2 -8.6 -9.1 -8.8 -8.4 -11.7 -13.2 -14.0
-15.8 -15.6 -13.3 -14.6 -15.5 -15.7 -16.6 -17.8 -18.8 -18.6 -15.3 -14.8 -16.2 -16.3 -14.9 -15.4 -16.0 -16.0 -17.7 -19.2 -16.7 -14.8 -13.9 -15.0 -17.1 -16.5 -17.7 -16.2 -16.6 -15.0 -13.8 -12.8 -13.3 -12.7 -15.5 -14.0
-15.2 -14.1 -14.3 -14.6 -14.3 -13.0 -14.5 -16.5 -16.2 -17.7 -18.8 -16.6 -16.3 -15.0 -14.4 -14.6 -16.0 -15.6 -13.9 -16.8 -19.2 -19.2 -18.5 -18.0 -17.8 -15.8 -18.5 -17.5 -18.0 -19.1 -19.0 -18.7 -16.5 -15.3 -16.6 -14.4
-13.4 -12.6 -12.4 -13.5 -14.4 -15.1 -15.0 -14.5 -15.0 -16.1 -15.7 -16.5 -18.9 -16.5 -13.7 -10.8 -11.0 -11.3 -9.8 -10.4 -9.3 -11.8 -11.9 -8.4 -10.8 -11.2 -9.8 -10.7 -10.5 -9.4 -9.6 -9.0 -11.3 -11.3 -12.1 -12.9
-8.7 -11.2 -13.1 -12.8 -11.1 -8.9 -6.1 -7.8 -5.1 -3.5 -6.5 -7.8 -15.2 -11.0 -9.9 -7.0 -7.2 -3.6 -1.7 -.2 .4 1.9 3.7 3.5 2.0 1.5 4.3 6.4 4.3 5.2 3.1 2.9 2.3 1.6 -4.9 -8.8
-7.8 -9.2 -8.3 -2.8 -3.6 -3.5 -2.2 3.9 6.0 .3 -3.9 -8.1 -8.1 -5.1 -2.9 -.4 .8 2.4 3.6 4.6 4.0 3.9 4.8 5.6 5.4 6.7 5.2 3.6 2.8 2.7 1.5 1.1 1.4 3.3 -4.6 -8.0

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : HIRS8 channel (Surface)
NOAA-15, USING ALL OBSERVATIONS

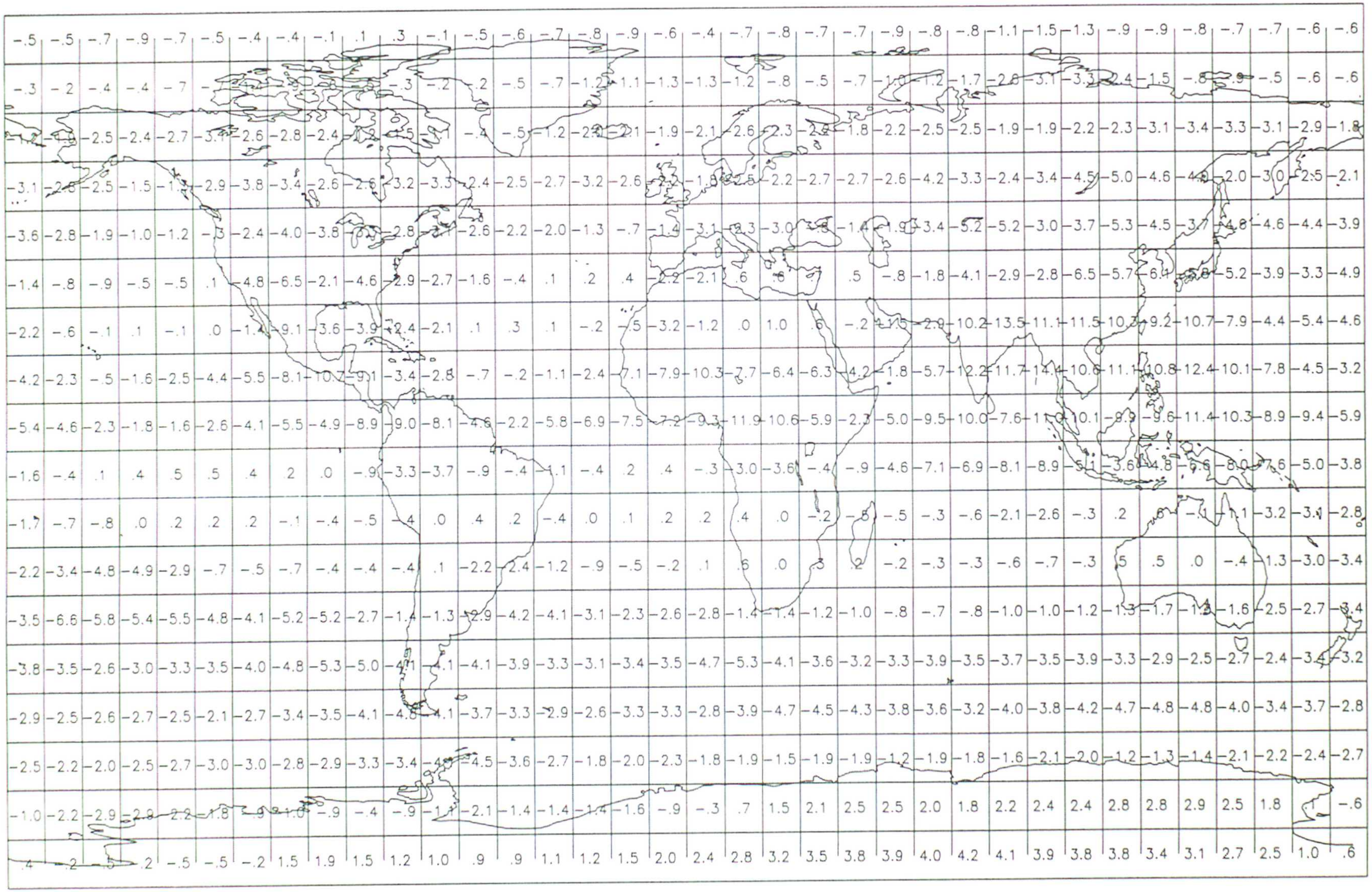
FIGURE 27



6.2	6.4	6.9	7.5	7.0	6.4	6.4	6.6	7.5	8.9	9.8	10.0	8.4	8.2	9.1	10.3	7.9	6.5	6.5	7.1	7.2	6.6	6.7	7.2	7.3	7.5	8.3	8.9	8.9	8.1	8.0	8.0	8.1	8.1	7.3	6.5
6.9	6.9	7.7	7.4	7.4	8.0	9.7	9.4	10.5	11.4	8.9	7.7	8.5	6.6	6.8	10.3	8.9	8.4	7.6	8.6	7.8	7.3	7.4	8.0	8.4	10.0	11.8	12.1	12.3	12.9	11.1	9.9	10.8	8.6	7.8	7.1
10.5	12.1	13.2	14.3	14.1	13.1	12.2	12.2	11.9	10.5	11.2	10.1	10.0	10.2	10.1	11.3	10.9	9.6	10.3	11.8	13.1	14.6	12.9	12.6	12.9	13.7	13.5	14.3	15.2	13.7	14.0	14.7	13.5	13.7	13.5	12.7
10.8	10.6	10.9	9.8	10.3	13.0	14.2	15.5	15.6	16.6	15.0	13.8	11.6	11.6	11.7	12.1	11.1	15.5	11.4	14.6	15.6	17.3	16.4	14.9	16.1	17.4	17.2	17.1	16.4	16.0	16.5	16.4	12.9	13.5	11.8	10.3
13.1	12.9	10.8	8.2	8.4	8.1	13.1	17.8	21.1	18.6	16.0	15.5	14.6	13.4	12.5	10.5	8.1	11.7	16.0	15.5	17.3	12.8	13.0	14.0	15.9	18.7	20.9	19.1	19.2	18.2	17.7	15.9	16.3	15.8	14.7	14.1
12.1	10.2	7.8	5.8	6.1	4.6	20.2	21.5	16.5	21.0	18.5	16.2	13.8	9.6	6.3	5.2	3.7	13.4	14.6	14.2	5.3	6.4	8.5	12.0	12.1	19.4	21.0	18.4	18.5	18.5	19.0	18.6	19.1	16.5	15.9	18.2
14.8	8.9	5.7	3.7	3.6	3.8	12.9	26.1	18.4	18.4	16.1	14.2	6.5	4.4	5.2	6.8	7.8	12.1	9.1	6.9	3.8	6.6	9.9	11.8	14.3	24.6	28.2	21.7	23.7	23.1	23.2	26.6	24.5	20.4	21.5	20.8
18.2	13.5	8.7	12.6	15.3	19.0	21.0	24.2	26.5	25.3	18.5	17.0	9.9	6.8	10.3	13.3	22.1	25.2	28.4	26.0	22.6	19.9	17.5	11.4	16.8	22.8	24.5	22.8	23.4	25.6	24.7	27.1	25.2	24.7	20.1	17.4
22.2	19.6	14.3	13.5	12.6	14.2	17.7	19.3	18.7	23.0	23.5	22.5	18.7	14.1	21.2	21.0	21.8	21.8	22.5	24.8	22.8	17.5	10.4	18.3	23.1	23.5	20.7	23.7	24.4	22.3	23.8	26.5	25.2	25.2	27.3	22.5
14.6	9.3	5.2	4.0	3.0	2.7	3.0	3.4	3.8	6.0	14.7	18.0	11.8	9.7	11.2	7.1	4.5	3.8	5.8	16.1	18.2	7.7	6.9	17.6	22.0	22.9	23.1	23.7	20.9	17.4	19.1	20.2	22.0	23.4	20.6	20.7
14.5	10.3	10.6	6.7	4.6	3.9	3.6	4.0	4.4	4.4	7.4	7.5	4.7	4.3	6.2	4.5	3.9	3.9	3.7	4.7	5.4	5.8	6.8	5.9	5.2	6.7	11.3	13.5	5.6	4.3	5.5	7.8	10.1	16.1	15.7	16.8
13.1	16.4	19.1	19.7	15.8	10.0	8.3	8.6	6.2	6.0	7.0	9.6	13.5	14.9	10.8	9.0	6.3	5.3	4.7	4.8	6.4	5.3	5.2	5.4	5.5	5.8	6.4	7.1	5.9	6.6	7.2	8.3	9.4	11.6	15.9	16.7
16.6	20.3	18.9	18.5	18.6	17.0	15.6	17.6	17.1	12.7	12.9	12.6	16.9	17.7	18.1	15.3	13.6	13.2	13.2	11.8	13.9	12.4	10.6	8.4	7.6	8.3	9.7	9.5	10.8	11.9	12.6	12.2	12.1	14.8	15.1	18.0
15.7	16.1	12.9	13.6	13.9	13.8	15.2	17.2	17.9	16.2	17.0	17.3	16.8	15.4	13.9	13.2	14.1	13.9	15.6	16.6	15.7	15.2	14.6	13.8	14.5	14.2	14.5	15.0	15.5	14.9	13.5	12.8	13.2	12.7	14.4	15.5
13.1	12.7	12.0	11.3	10.9	10.5	12.1	13.3	14.0	15.2	15.5	18.2	14.8	13.0	12.2	11.3	12.8	12.4	11.5	13.1	13.8	13.6	13.1	12.7	12.3	12.5	12.6	13.0	13.3	14.0	14.3	14.1	13.4	12.3	12.6	12.9
11.2	11.1	10.8	11.1	11.0	10.9	10.7	10.4	11.2	11.7	12.7	14.[illegible]	14.6	12.9	12.4	10.4	9.4	10.4	10.2	11.3	11.6	11.6	11.5	11.1	11.0	9.4	9.9	11.1	11.6	10.7	11.9	13.0	13.6	12.5	12.0	11.2
9.3	11.7	13.7	14.6	13.9	14.9	13.7	12.7	13.9	14.3	13.8	12.4	11.4	12.5	12.4	14.1	12.9	11.8	11.2	9.5	8.8	7.5	6.6	5.2	6.4	7.4	6.4	7.8	7.4	6.1	5.2	5.0	5.5	7.3	11.3	8.6
12.2	13.2	15.1	15.8	15.5	15.3	13.7	11.0	9.4	7.1	8.3	9.9	11.5	11.2	10.0	9.4	8.3	7.8	7.2	6.8	5.8	5.3	5.1	5.9	6.2	7.1	8.1	6.6	6.1	6.1	5.8	5.2	6.0	8.6	13.4	11.9

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : HIRS15 Channel (700 hPa)
NOAA–15, USING ALL OBSERVATIONS

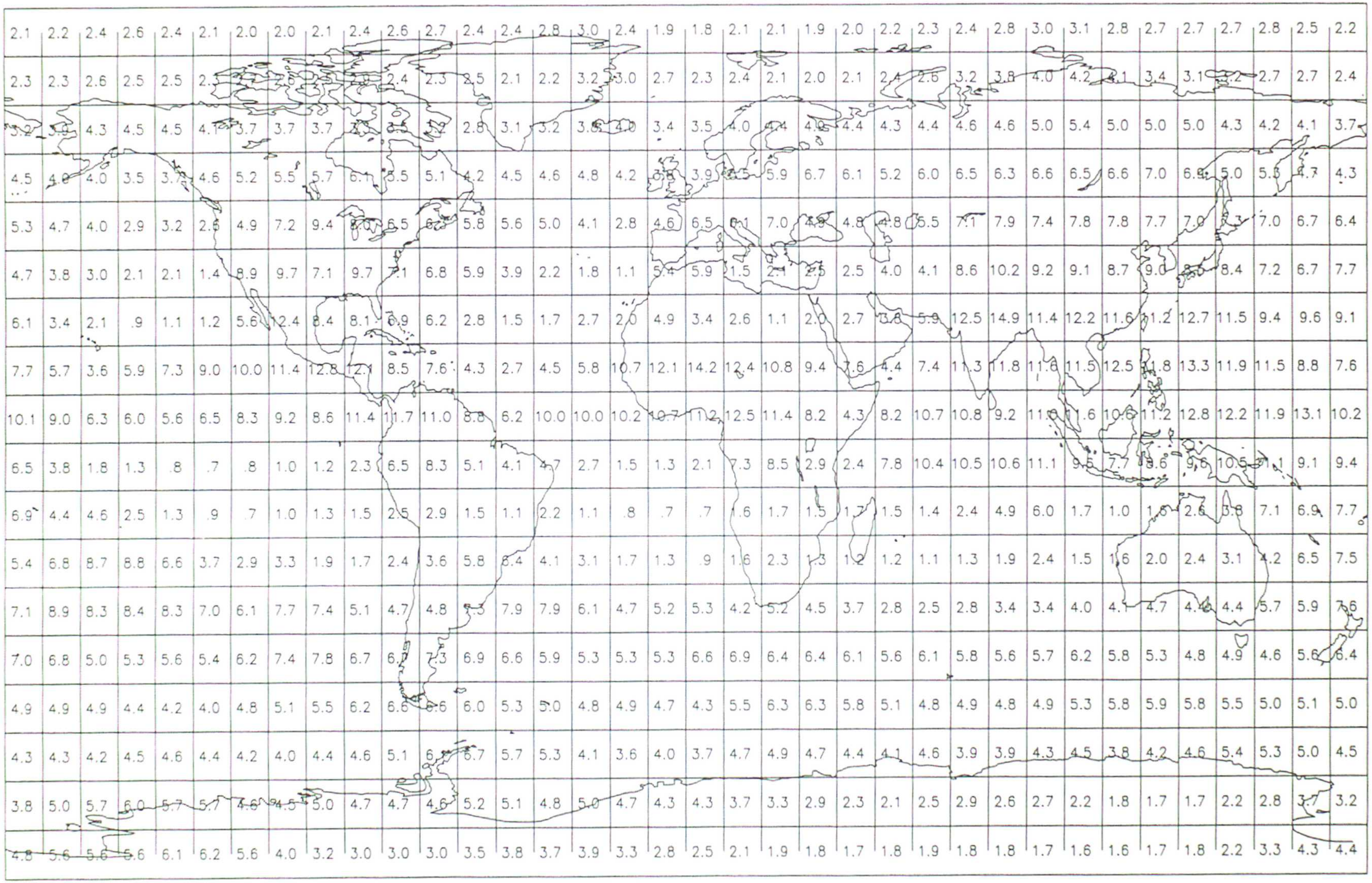
FIGURE 28



-.5	-.5	-.7	-.9	-.7	-.5	-.4	-.4	-.1	.1	.3	-.1	-.5	-.6	-.7	-.8	-.9	-.6	-.4	-.7	-.8	-.7	-.7	-.9	-.8	-.8	-1.1	-1.5	-1.3	-.9	-.9	-.8	-.7	-.7	-.6	-.6
-.3	-.2	-.4	-.4	-.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-.3	-.2	.2	-.5	-.7	-1.2	-1.1	-1.3	-1.3	-1.2	-.8	-.5	-.7	-1.0	-1.2	-1.7	-2.8	-3.1	-3.3	-2.4	-1.5	-.8	-.9	-.5	-.6	-.6
-1.2	-1.9	-2.5	-2.4	-2.7	-3.1	-2.6	-2.8	-2.4	-1.2	-1.5	-1.1	-.4	-.5	-1.2	-2.3	-2.1	-1.9	-2.1	-2.6	-2.3	[illegible]	-1.8	-2.2	-2.5	-2.5	-1.9	-1.9	-2.2	-2.3	-3.1	-3.4	-3.3	-3.1	-2.9	-1.8
-3.1	[illegible]	-2.5	-1.5	[illegible]	-2.9	-3.8	-3.4	-2.6	-2.6	-3.2	-3.3	-2.4	-2.5	-2.7	-3.2	-2.6	-2.2	-1.8	-2.5	-2.2	-2.7	-2.7	-2.6	-4.2	-3.3	-2.4	-3.4	-4.5	-5.0	-4.6	[illegible]	-2.0	-3.0	-2.5	-2.1
-3.6	-2.8	-1.9	-1.0	-1.2	-.3	-2.4	-4.0	-3.8	[illegible]	-2.8	[illegible]	-2.6	-2.2	-2.0	-1.3	-.7	-1.4	-3.1	-2.3	-3.0	[illegible]	-1.4	-1.9	-3.4	-5.2	-5.2	-3.0	-3.7	-5.3	-4.5	-3.7	-4.8	-4.6	-4.4	-3.9
-1.4	-.8	-.9	-.5	-.5	.1	-4.8	-6.5	-2.1	-4.6	-2.9	-2.7	-1.6	-.4	.1	.2	.4	-2.2	-2.1	.6	.6	.7	.5	-.8	-1.8	-4.1	-2.9	-2.8	-6.5	-5.7	-6.1	-5.8	-5.2	-3.9	-3.3	-4.9
-2.2	-.6	-.1	.1	-.1	.0	-1.4	-9.1	-3.6	-3.9	-2.4	-2.1	.1	.3	.1	-.2	-.5	-3.2	-1.2	.0	1.0	.6	-.2	-1.5	-2.9	-10.2	-13.5	-11.1	-11.5	-10.3	-9.2	-10.7	-7.9	-4.4	-5.4	-4.6
-4.2	-2.3	-.5	-1.6	-2.5	-4.4	-5.5	-8.1	-10.7	-9.1	-3.4	-2.8	-.7	-.2	-1.1	-2.4	-7.1	-7.9	-10.3	-7.7	-6.4	-6.3	-4.2	-1.8	-5.7	-12.2	-11.7	-14.4	-10.6	-11.1	-10.8	-12.4	-10.1	-7.8	-4.5	-3.2
-5.4	-4.6	-2.3	-1.8	-1.6	-2.6	-4.1	-5.5	-4.9	-8.9	-9.0	-8.1	-4.6	-2.2	-5.8	-6.9	-7.5	-7.2	-9.3	-11.9	-10.6	-5.9	-2.3	-5.0	-9.5	-10.0	-7.6	-11.0	-10.1	-8.9	-9.6	-11.4	-10.3	-8.9	-9.4	-5.9
-1.6	-.4	.1	.4	.5	.5	.4	.2	.0	-.9	-3.3	-3.7	-.9	-.4	-1.1	-.4	.2	.4	-.3	-3.0	-3.6	-.4	-.9	-4.6	-7.1	-6.9	-8.1	-8.9	-5.1	-3.6	-4.8	-9.6	-8.0	-7.6	-5.0	-3.8
-1.7	-.7	-.8	.0	.2	.2	.2	-.1	-.4	-.5	-.4	.0	.4	.2	-.4	.0	.1	.2	.2	.4	.0	-.2	-.8	-.5	-.3	-.6	-2.1	-2.6	-.3	.2	.6	-.1	-1.1	-3.2	-3.1	-2.8
-2.2	-3.4	-4.8	-4.9	-2.9	-.7	-.5	-.7	-.4	-.4	-.4	.1	-2.2	-2.4	-1.2	-.9	-.5	-.2	.1	.6	.0	.3	.2	-.2	-.3	-.3	-.6	-.7	-.3	.5	.5	.0	-.4	-1.3	-3.0	-3.4
-3.5	-6.6	-5.8	-5.4	-5.5	-4.8	-4.1	-5.2	-5.2	-2.7	-1.4	-1.3	-2.9	-4.2	-4.1	-3.1	-2.3	-2.6	-2.8	-1.4	-1.4	-1.2	-1.0	-.8	-.7	-.8	-1.0	-1.0	-1.2	-1.3	-1.7	-1.3	-1.6	-2.5	-2.7	-3.4
-3.8	-3.5	-2.6	-3.0	-3.3	-3.5	-4.0	-4.8	-5.3	-5.0	-4.1	-4.1	-4.1	-3.9	-3.3	-3.1	-3.4	-3.5	-4.7	-5.3	-4.1	-3.6	-3.2	-3.3	-3.9	-3.5	-3.7	-3.5	-3.9	-3.3	-2.9	-2.5	-2.7	-2.4	-3.4	-3.2
-2.9	-2.5	-2.6	-2.7	-2.5	-2.1	-2.7	-3.4	-3.5	-4.1	-4.8	-4.1	-3.7	-3.3	-2.9	-2.6	-3.3	-3.3	-2.8	-3.9	-4.7	-4.5	-4.3	-3.8	-3.6	-3.2	-4.0	-3.8	-4.2	-4.7	-4.8	-4.8	-4.0	-3.4	-3.7	-2.8
-2.5	-2.2	-2.0	-2.5	-2.7	-3.0	-3.0	-2.8	-2.9	-3.3	-3.4	[illegible]	-4.5	-3.6	-2.7	-1.8	-2.0	-2.3	-1.8	-1.9	-1.5	-1.9	-1.9	-1.2	-1.9	-1.8	-1.6	-2.1	-2.0	-1.2	-1.3	-1.4	-2.1	-2.2	-2.4	-2.7
-1.0	-2.2	-2.9	-2.8	-2.2	-1.8	-.9	-1.0	-.9	-.4	-.9	-1.1	-2.1	-1.4	-1.4	-1.4	-1.6	-.9	-.3	.7	1.5	2.1	2.5	2.5	2.0	1.8	2.2	2.4	2.4	2.8	2.8	2.9	2.5	1.8	.1	-.6
.4	-.2	-.5	.2	-.5	-.5	-.2	1.5	1.9	1.5	1.2	1.0	.9	.9	1.1	1.2	1.5	2.0	2.4	2.8	3.2	3.5	3.8	3.9	4.0	4.2	4.1	3.9	3.8	3.8	3.4	3.1	2.7	2.5	1.0	.6

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : HIRS15 channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

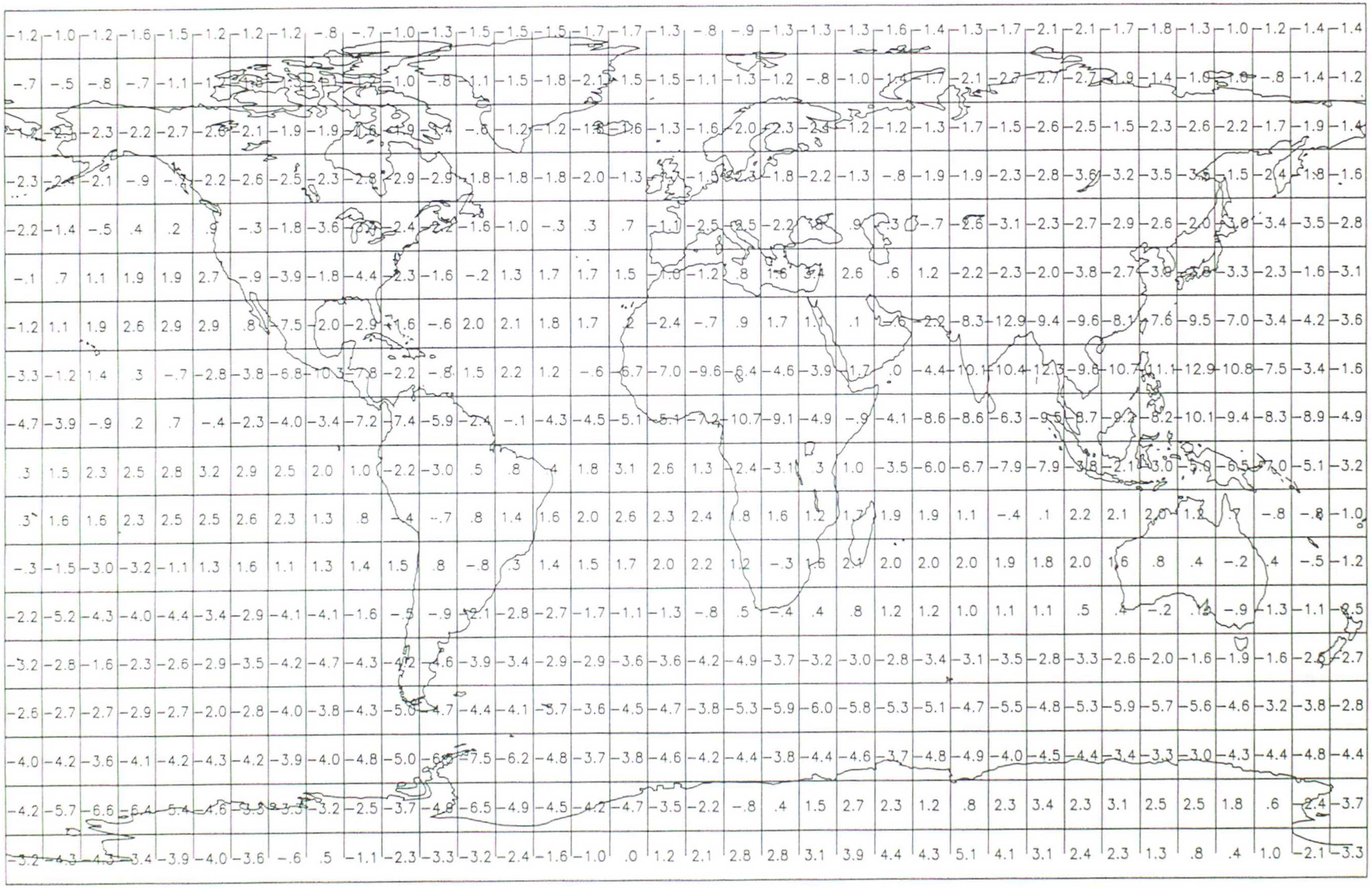
FIGURE 29



2.1	2.2	2.4	2.6	2.4	2.1	2.0	2.0	2.1	2.4	2.6	2.7	2.4	2.4	2.8	3.0	2.4	1.9	1.8	2.1	2.1	1.9	2.0	2.2	2.3	2.4	2.8	3.0	3.1	2.8	2.7	2.7	2.7	2.8	2.5	2.2
2.3	2.3	2.6	2.5	2.5	2.3	2.7	2.6	[illegible]	2.0	2.4	2.3	2.5	2.1	2.2	3.2	3.0	2.7	2.3	2.4	2.1	2.0	2.1	2.4	2.6	3.2	3.8	4.0	4.2	4.1	3.4	3.1	3.2	2.7	2.7	2.4
3.2	3.9	4.3	4.5	4.5	4.1	3.7	3.7	3.7	3.3	3.5	3.2	2.8	3.1	3.2	3.8	4.0	3.4	3.5	4.0	4.4	4.9	4.4	4.3	4.4	4.6	4.6	5.0	5.4	5.0	5.0	5.0	4.3	4.2	4.1	3.7
4.5	4.0	4.0	3.5	3.7	4.6	5.2	5.5	5.7	6.1	5.5	5.1	4.2	4.5	4.6	4.8	4.2	3.8	3.9	3.5	5.9	6.7	6.1	5.2	6.0	6.5	6.3	6.6	6.5	6.6	7.0	6.9	5.0	5.3	4.7	4.3
5.3	4.7	4.0	2.9	3.2	2.6	4.9	7.2	9.4	8.0	6.5	6.3	5.8	5.6	5.0	4.1	2.8	4.6	6.5	6.1	7.0	4.9	4.8	4.8	5.5	7.1	7.9	7.4	7.8	7.8	7.7	7.0	7.3	7.0	6.7	6.4
4.7	3.8	3.0	2.1	2.1	1.4	8.9	9.7	7.1	9.7	7.1	6.8	5.9	3.9	2.2	1.8	1.1	5.4	5.9	1.5	2.1	2.5	2.5	4.0	4.1	8.6	10.2	9.2	9.1	8.7	9.0	8.5	8.4	7.2	6.7	7.7
6.1	3.4	2.1	.9	1.1	1.2	5.6	12.4	8.4	8.1	6.9	6.2	2.8	1.5	1.7	2.7	2.0	4.9	3.4	2.6	1.1	2.0	2.7	3.8	5.9	12.5	14.9	11.4	12.2	11.6	11.2	12.7	11.5	9.4	9.6	9.1
7.7	5.7	3.6	5.9	7.3	9.0	10.0	11.4	12.8	12.1	8.5	7.6	4.3	2.7	4.5	5.8	10.7	12.1	14.2	12.4	10.8	9.4	7.6	4.4	7.4	11.3	11.8	11.6	11.5	12.5	11.8	13.3	11.9	11.5	8.8	7.6
10.1	9.0	6.3	6.0	5.6	6.5	8.3	9.2	8.6	11.4	11.7	11.0	8.8	6.2	10.0	10.0	10.2	10.7	11.2	12.5	11.4	8.2	4.3	8.2	10.7	10.8	9.2	11.0	11.6	10.6	11.2	12.8	12.2	11.9	13.1	10.2
6.5	3.8	1.8	1.3	.8	.7	.8	1.0	1.2	2.3	6.5	8.3	5.1	4.1	4.7	2.7	1.5	1.3	2.1	7.3	8.5	2.9	2.4	7.8	10.4	10.5	10.6	11.1	9.5	7.7	8.6	9.6	10.5	11.1	9.1	9.4
6.9	4.4	4.6	2.5	1.3	.9	.7	1.0	1.3	1.5	2.5	2.9	1.5	1.1	2.2	1.1	.8	.7	.7	1.6	1.7	1.5	1.7	1.5	1.4	2.4	4.9	6.0	1.7	1.0	1.6	2.6	3.8	7.1	6.9	7.7
5.4	6.8	8.7	8.8	6.6	3.7	2.9	3.3	1.9	1.7	2.4	3.6	5.8	6.4	4.1	3.1	1.7	1.3	.9	1.6	2.3	1.3	1.2	1.2	1.1	1.3	1.9	2.4	1.5	1.6	2.0	2.4	3.1	4.2	6.5	7.5
7.1	8.9	8.3	8.4	8.3	7.0	6.1	7.7	7.4	5.1	4.7	4.8	7.3	7.9	7.9	6.1	4.7	5.2	5.3	4.2	5.2	4.5	3.7	2.8	2.5	2.8	3.4	3.4	4.0	4.1	4.7	4.6	4.4	5.7	5.9	7.6
7.0	6.8	5.0	5.3	5.6	5.4	6.2	7.4	7.8	6.7	6.7	7.3	6.9	6.6	5.9	5.3	5.3	5.3	6.6	6.9	6.4	6.4	6.1	5.6	6.1	5.8	5.6	5.7	6.2	5.8	5.3	4.8	4.9	4.6	5.6	6.4
4.9	4.9	4.9	4.4	4.2	4.0	4.8	5.1	5.5	6.2	6.6	6.6	6.0	5.3	5.0	4.8	4.9	4.7	4.3	5.5	6.3	6.3	5.8	5.1	4.8	4.9	4.8	4.9	5.3	5.8	5.9	5.8	5.5	5.0	5.1	5.0
4.3	4.3	4.2	4.5	4.6	4.4	4.2	4.0	4.4	4.6	5.1	[illegible]	6.7	5.7	5.3	4.1	3.6	4.0	3.7	4.7	4.9	4.7	4.4	4.1	4.6	3.9	3.9	4.3	4.5	3.8	4.2	4.6	5.4	5.3	5.0	4.5
3.8	5.0	5.7	6.0	5.7	5.7	4.6	4.5	5.0	4.7	4.7	4.6	5.2	5.1	4.8	5.0	4.7	4.3	4.3	3.7	3.3	2.9	2.3	2.1	2.5	2.9	2.6	2.7	2.2	1.8	1.7	1.7	2.2	2.8	3.7	3.2
4.8	5.6	5.6	5.6	6.1	6.2	5.6	4.0	3.2	3.0	3.0	3.0	3.5	3.8	3.7	3.9	3.3	2.8	2.5	2.1	1.9	1.8	1.7	1.8	1.9	1.8	1.8	1.7	1.6	1.6	1.7	1.8	2.2	3.3	4.3	4.4

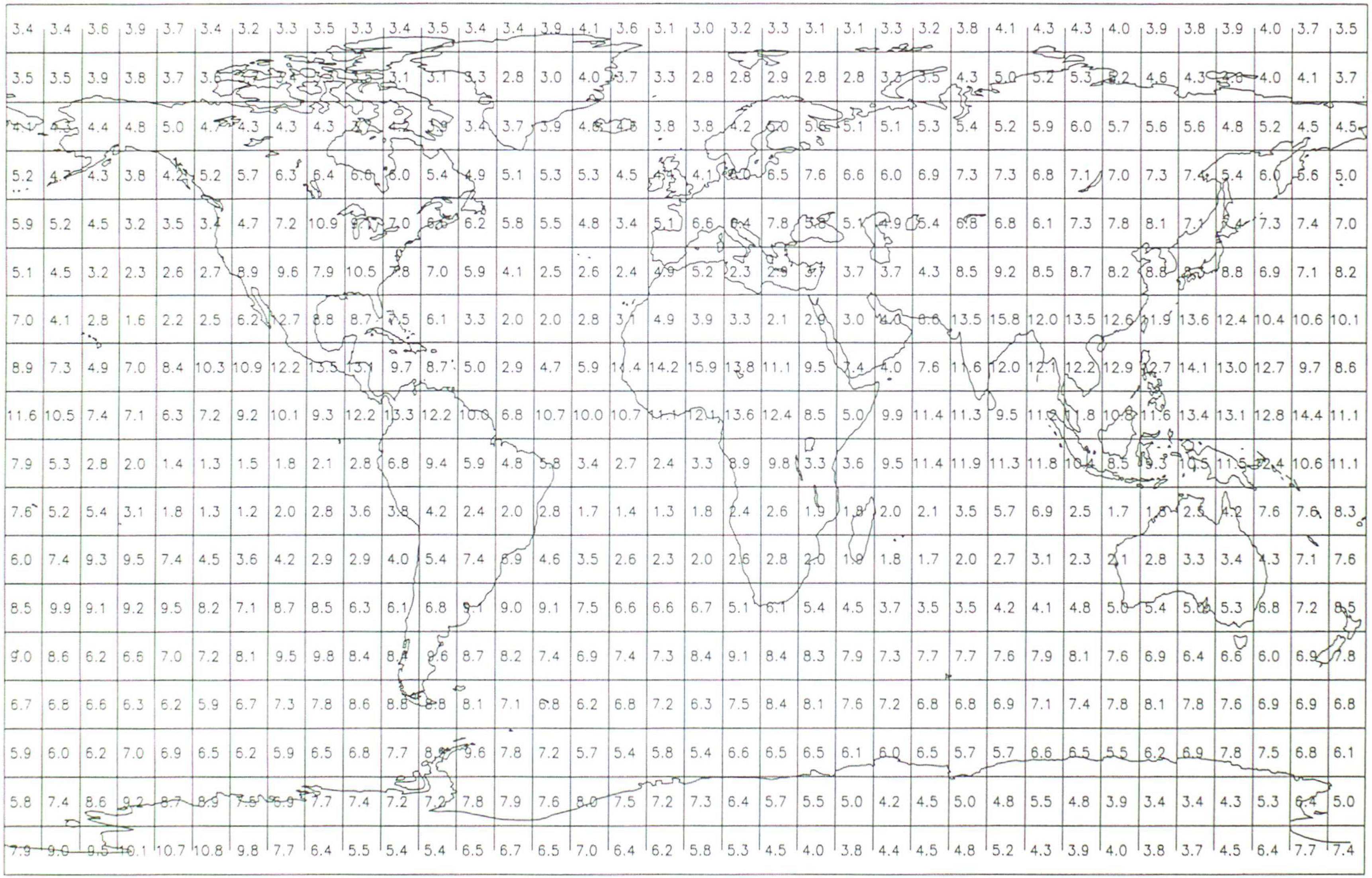
ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : HIRS11 Channel (500–700 hPa)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 30


-1.2 -1.0 -1.2 -1.6 -1.5 -1.2 -1.2 -1.2 -.8 -.7 -1.0 -1.3 -1.5 -1.5 -1.5 -1.7 -1.7 -1.3 -.8 -.9 -1.3 -1.3 -1.3 -1.6 -1.4 -1.3 -1.7 -2.1 -2.1 -1.7 -1.8 -1.3 -1.0 -1.2 -1.4 -1.4
-.7 -.5 -.8 -.7 -1.1 -1.2 [illegible] [illegible] [illegible] [illegible] -1.0 -.8 -1.1 -1.5 -1.8 -2.1 -1.5 -1.5 -1.1 -1.3 -1.2 -.8 -1.0 -1.4 -1.7 -2.1 -2.7 -2.7 -2.7 -1.9 -1.4 -1.0 -1.0 -.8 -1.4 -1.2
-1.2 -2.1 -2.3 -2.2 -2.7 -2.6 -2.1 -1.9 -1.9 -1.6 -1.9 -1.4 -.6 -1.2 -1.2 -1.3 -1.6 -1.3 -1.6 -2.0 -2.3 -2.4 -1.2 -1.2 -1.3 -1.7 -1.5 -2.6 -2.5 -1.5 -2.3 -2.6 -2.2 -1.7 -1.9 -1.4
-2.3 -2.4 -2.1 -.9 [illegible] -2.2 -2.6 -2.5 -2.3 -2.8 -2.9 -2.9 -1.8 -1.8 -1.8 -2.0 -1.3 [illegible] -1.5 -2.3 -1.8 -2.2 -1.3 -.8 -1.9 -1.9 -2.3 -2.8 -3.6 -3.2 -3.5 -3.5 -1.5 -2.4 -1.8 -1.6
-2.2 -1.4 -.5 .4 .2 .9 -.3 -1.8 -3.6 [illegible] -2.4 -2.2 -1.6 -1.0 -.3 .3 .7 -1.1 -2.5 -2.5 -2.2 -1.8 .9 -.3 -.7 -2.6 -3.1 -2.3 -2.7 -2.9 -2.6 -2.0 -3.0 -3.4 -3.5 -2.8
-.1 .7 1.1 1.9 1.9 2.7 -.9 -3.9 -1.8 -4.4 -2.3 -1.6 -.2 1.3 1.7 1.7 1.5 -1.0 -1.2 .8 1.6 3.4 2.6 .6 1.2 -2.2 -2.3 -2.0 -3.8 -2.7 -3.9 -3.8 -3.3 -2.3 -1.6 -3.1
-1.2 1.1 1.9 2.6 2.9 2.9 .8 -7.5 -2.0 -2.9 -1.6 -.6 2.0 2.1 1.8 1.7 .2 -2.4 -.7 .9 1.7 1.1 .1 -.6 -2.2 -8.3 -12.9 -9.4 -9.6 -8.1 -7.6 -9.5 -7.0 -3.4 -4.2 -3.6
-3.3 -1.2 1.4 .3 -.7 -2.8 -3.8 -6.8 -10.3 -7.8 -2.2 -.8 1.5 2.2 1.2 -.6 -6.7 -7.0 -9.6 -6.4 -4.6 -3.9 -1.7 .0 -4.4 -10.1 -10.4 -12.3 -9.8 -10.7 -11.1 -12.9 -10.8 -7.5 -3.4 -1.6
-4.7 -3.9 -.9 .2 .7 -.4 -2.3 -4.0 -3.4 -7.2 -7.4 -5.9 -2.4 -.1 -4.3 -4.5 -5.1 -5.1 -7.2 -10.7 -9.1 -4.9 -.9 -4.1 -8.6 -8.6 -6.3 -9.5 -8.7 -9.2 -8.2 -10.1 -9.4 -8.3 -8.9 -4.9
.3 1.5 2.3 2.5 2.8 3.2 2.9 2.5 2.0 1.0 -2.2 -3.0 .5 .8 .4 1.8 3.1 2.6 1.3 -2.4 -3.1 .3 1.0 -3.5 -6.0 -6.7 -7.9 -7.9 -3.8 -2.1 -3.0 -5.0 -6.5 -7.0 -5.1 -3.2
.3 1.6 1.6 2.3 2.5 2.5 2.6 2.3 1.3 .8 -.4 -.7 .8 1.4 1.6 2.0 2.6 2.3 2.4 .8 1.6 1.2 1.7 1.9 1.9 1.1 -.4 .1 2.2 2.1 2.0 1.2 .7 -.8 -.8 -1.0
-.3 -1.5 -3.0 -3.2 -1.1 1.3 1.6 1.1 1.3 1.4 1.5 .8 -.8 .3 1.4 1.5 1.7 2.0 2.2 1.2 -.3 1.6 2.1 2.0 2.0 2.0 1.9 1.8 2.0 1.6 .8 .4 -.2 .4 -.5 -1.2
-2.2 -5.2 -4.3 -4.0 -4.4 -3.4 -2.9 -4.1 -4.1 -1.6 -.5 -.9 -2.1 -2.8 -2.7 -1.7 -1.1 -1.3 -.8 .5 -.4 .4 .8 1.2 1.2 1.0 1.1 1.1 .5 .4 -.2 [illegible] -.9 -1.3 -1.1 -2.5
-3.2 -2.8 -1.6 -2.3 -2.6 -2.9 -3.5 -4.2 -4.7 -4.3 -4.2 -4.6 -3.9 -3.4 -2.9 -2.9 -3.6 -3.6 -4.2 -4.9 -3.7 -3.2 -3.0 -2.8 -3.4 -3.1 -3.5 -2.8 -3.3 -2.6 -2.0 -1.6 -1.9 -1.6 -2.6 -2.7
-2.6 -2.7 -2.7 -2.9 -2.7 -2.0 -2.8 -4.0 -3.8 -4.3 -5.0 -4.7 -4.4 -4.1 -3.7 -3.6 -4.5 -4.7 -3.8 -5.3 -5.9 -6.0 -5.8 -5.3 -5.1 -4.7 -5.5 -4.8 -5.3 -5.9 -5.7 -5.6 -4.6 -3.2 -3.8 -2.8
-4.0 -4.2 -3.6 -4.1 -4.2 -4.3 -4.2 -3.9 -4.0 -4.8 -5.0 [illegible] -7.5 -6.2 -4.8 -3.7 -3.8 -4.6 -4.2 -4.4 -3.8 -4.4 -4.6 -3.7 -4.8 -4.9 -4.0 -4.5 -4.4 -3.4 -3.3 -3.0 -4.3 -4.4 -4.8 -4.4
-4.2 -5.7 -6.6 -6.4 -5.4 -4.6 -3.5 -3.3 -3.2 -2.5 -3.7 -4.8 -6.5 -4.9 -4.5 -4.2 -4.7 -3.5 -2.2 -.8 .4 1.5 2.7 2.3 1.2 .8 2.3 3.4 2.3 3.1 2.5 2.5 1.8 .6 -2.4 -3.7
-3.2 -4.3 -4.3 -3.4 -3.9 -4.0 -3.6 -.6 .5 -1.1 -2.3 -3.3 -3.2 -2.4 -1.6 -1.0 .0 1.2 2.1 2.8 2.8 3.1 3.9 4.4 4.3 5.1 4.1 3.1 2.4 2.3 1.3 .8 .4 1.0 -2.1 -3.3

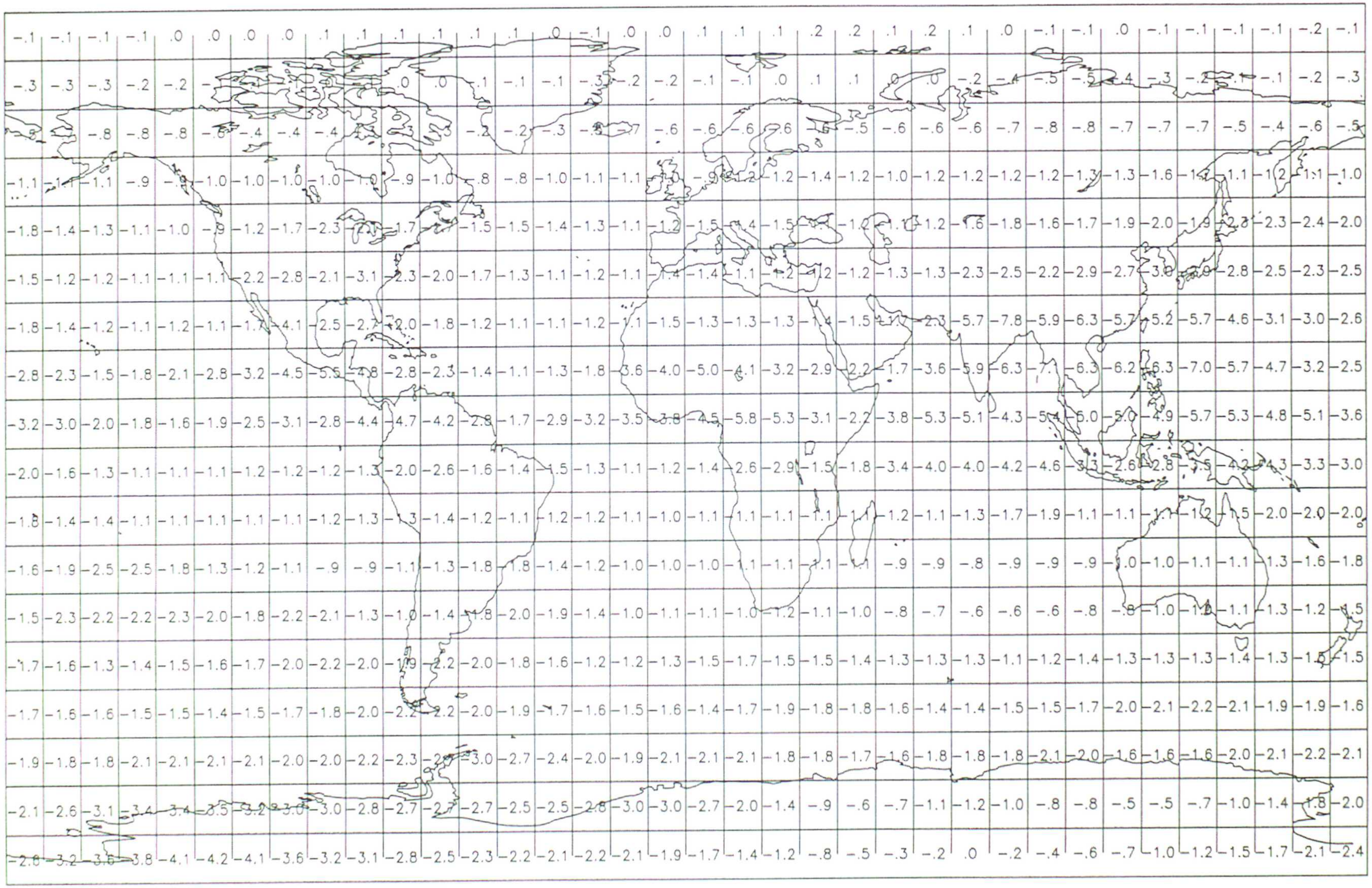
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : HIRS11 channel (500-700 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 31


3.4 3.4 3.6 3.9 3.7 3.4 3.2 3.3 3.5 3.3 3.4 3.5 3.4 3.4 3.9 4.1 3.6 3.1 3.0 3.2 3.3 3.1 3.1 3.3 3.2 3.8 4.1 4.3 4.3 4.0 3.9 3.8 3.9 4.0 3.7 3.5
3.5 3.5 3.9 3.8 3.7 3.6 3.7 3.4 [illegible] 3.5 3.1 3.1 3.3 2.8 3.0 4.0 3.7 3.3 2.8 2.8 2.9 2.8 2.8 3.3 3.5 4.3 5.0 5.2 5.3 5.2 4.6 4.3 4.0 4.0 4.1 3.7
4.1 4.3 4.4 4.8 5.0 4.7 4.3 4.3 4.3 3.7 4.2 3.9 3.4 3.7 3.9 4.6 4.5 3.8 3.8 4.2 5.0 5.6 5.1 5.1 5.3 5.4 5.2 5.9 6.0 5.7 5.6 5.6 4.8 5.2 4.5 4.5
5.2 4.7 4.3 3.8 4.2 5.2 5.7 6.3 6.4 6.6 6.0 5.4 4.9 5.1 5.3 5.3 4.5 4.4 4.1 6.0 6.5 7.6 6.6 6.0 6.9 7.3 7.3 6.8 7.1 7.0 7.3 7.4 5.4 6.0 5.6 5.0
5.9 5.2 4.5 3.2 3.5 3.4 4.7 7.2 10.9 9.1 7.0 6.5 6.2 5.8 5.5 4.8 3.4 5.1 6.6 6.4 7.8 5.8 5.1 4.9 5.4 6.8 6.8 6.1 7.3 7.8 8.1 7.1 5.4 7.3 7.4 7.0
5.1 4.5 3.2 2.3 2.6 2.7 8.9 9.6 7.9 10.5 7.8 7.0 5.9 4.1 2.5 2.6 2.4 4.9 5.2 2.3 2.9 3.7 3.7 3.7 4.3 8.5 9.2 8.5 8.7 8.2 8.8 [illegible] 8.8 6.9 7.1 8.2
7.0 4.1 2.8 1.6 2.2 2.5 6.2 12.7 8.8 8.7 7.5 6.1 3.3 2.0 2.0 2.8 3.1 4.9 3.9 3.3 2.1 2.9 3.0 4.0 8.6 13.5 15.8 12.0 13.5 12.6 11.9 13.6 12.4 10.4 10.6 10.1
8.9 7.3 4.9 7.0 8.4 10.3 10.9 12.2 13.5 13.1 9.7 8.7 5.0 2.9 4.7 5.9 [illegible] 14.2 15.9 13.8 11.1 9.5 7.4 4.0 7.6 11.6 12.0 12.1 12.2 12.9 12.7 14.1 13.0 12.7 9.7 8.6
11.6 10.5 7.4 7.1 6.3 7.2 9.2 10.1 9.3 12.2 13.3 12.2 10.0 6.8 10.7 10.0 10.7 11.1 12.1 13.6 12.4 8.5 5.0 9.9 11.4 11.3 9.5 11.2 11.8 10.8 11.6 13.4 13.1 12.8 14.4 11.1
7.9 5.3 2.8 2.0 1.4 1.3 1.5 1.8 2.1 2.8 6.8 9.4 5.9 4.8 5.8 3.4 2.7 2.4 3.3 8.9 9.8 3.3 3.6 9.5 11.4 11.9 11.3 11.8 10.4 8.5 9.3 10.5 11.5 12.4 10.6 11.1
7.6 5.2 5.4 3.1 1.8 1.3 1.2 2.0 2.8 3.6 3.8 4.2 2.4 2.0 2.8 1.7 1.4 1.3 1.8 2.4 2.6 1.9 1.8 2.0 2.1 3.5 5.7 6.9 2.5 1.7 1.8 2.5 4.2 7.6 7.6 8.3
6.0 7.4 9.3 9.5 7.4 4.5 3.6 4.2 2.9 2.9 4.0 5.4 7.4 6.9 4.6 3.5 2.6 2.3 2.0 2.6 2.8 2.0 1.9 1.8 1.7 2.0 2.7 3.1 2.3 2.1 2.8 3.3 3.4 4.3 7.1 7.6
8.5 9.9 9.1 9.2 9.5 8.2 7.1 8.7 8.5 6.3 6.1 6.8 9.1 9.0 9.1 7.5 6.6 6.6 6.7 5.1 6.1 5.4 4.5 3.7 3.5 3.5 4.2 4.1 4.8 5.0 5.4 5.0 5.3 6.8 7.2 8.5
9.0 8.6 6.2 6.6 7.0 7.2 8.1 9.5 9.8 8.4 8.4 9.6 8.7 8.2 7.4 6.9 7.4 7.3 8.4 9.1 8.4 8.3 7.9 7.3 7.7 7.7 7.6 7.9 8.1 7.6 6.9 6.4 6.6 6.0 6.9 7.8
6.7 6.8 6.6 6.3 6.2 5.9 6.7 7.3 7.8 8.6 8.8 8.8 8.1 7.1 6.8 6.2 6.8 7.2 6.3 7.5 8.4 8.1 7.6 7.2 6.8 6.8 6.9 7.1 7.4 7.8 8.1 7.8 7.6 6.9 6.9 6.8
5.9 6.0 6.2 7.0 6.9 6.5 6.2 5.9 6.5 6.8 7.7 8.8 9.6 7.8 7.2 5.7 5.4 5.8 5.4 6.6 6.5 6.5 6.1 6.0 6.5 5.7 5.7 6.6 6.5 5.5 6.2 6.9 7.8 7.5 6.8 6.1
5.8 7.4 8.6 9.2 8.7 8.9 7.5 6.9 7.7 7.4 7.2 7.2 7.8 7.9 7.6 8.0 7.5 7.2 7.3 6.4 5.7 5.5 5.0 4.2 4.5 5.0 4.8 5.5 4.8 3.9 3.4 3.4 4.3 5.3 6.4 5.0
7.9 9.0 9.5 10.1 10.7 10.8 9.8 7.7 6.4 5.5 5.4 5.4 6.5 6.7 6.5 7.0 6.4 6.2 5.8 5.3 4.5 4.0 3.8 4.4 4.5 4.8 5.2 4.3 3.9 4.0 3.8 3.7 4.5 6.4 7.7 7.4

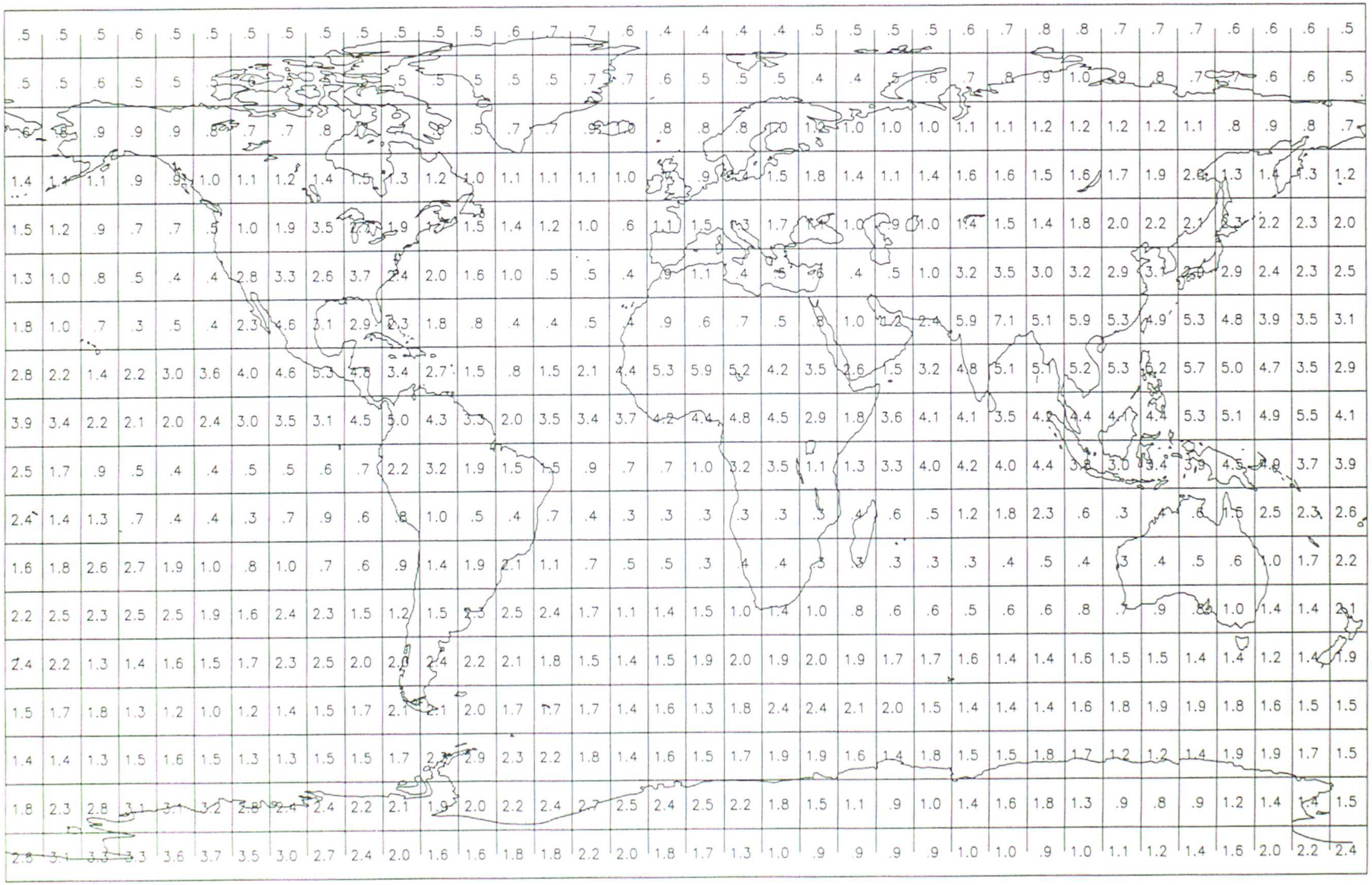
ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : HIRS4 channel (400 hPa)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 32



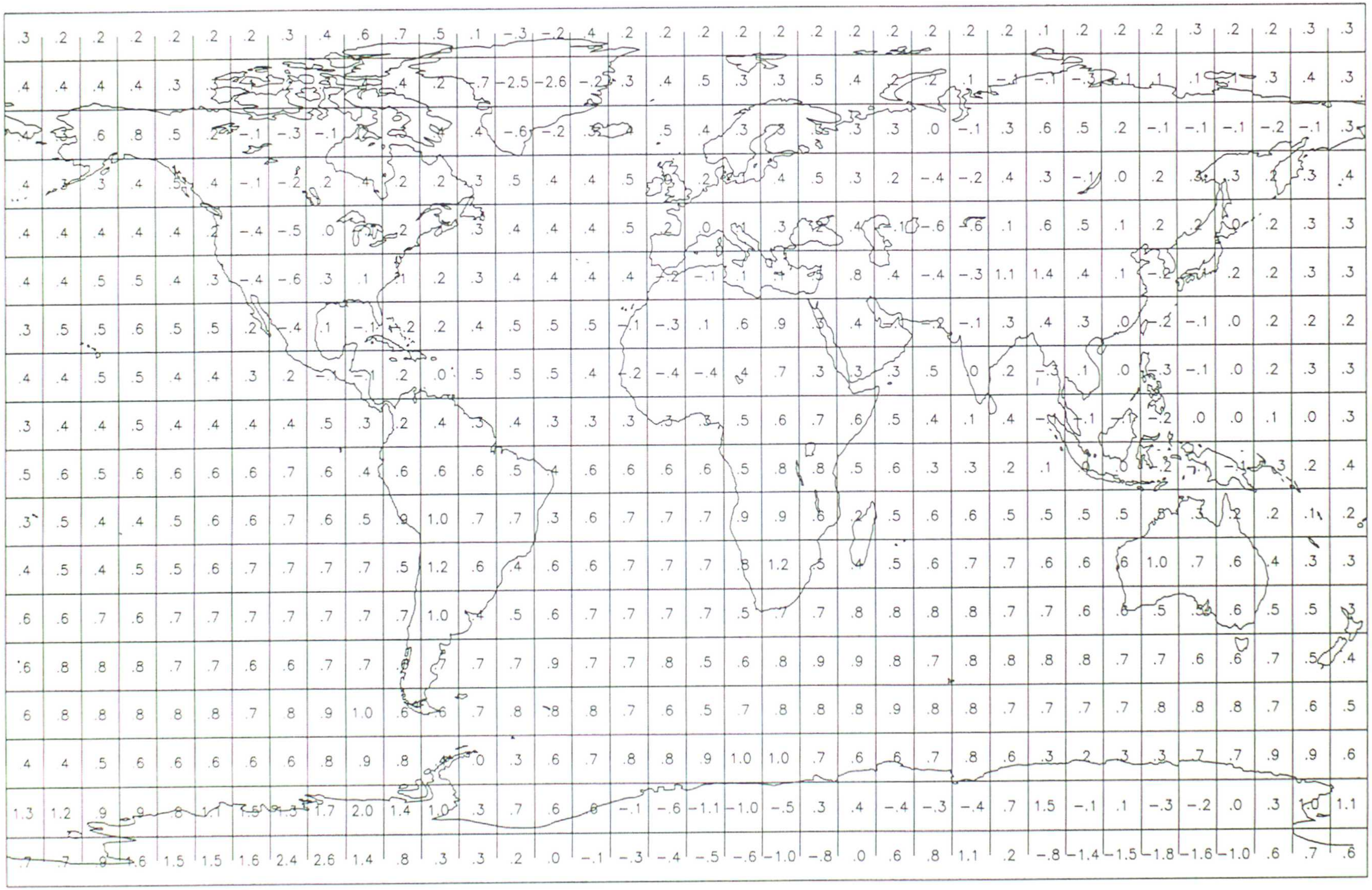
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : HIRS4 channel (400 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 33


.5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .7 .7 .6 .4 .4 .4 .4 .5 .5 .5 .5 .6 .7 .8 .8 .7 .7 .7 .6 .6 .6 .5
.5 .5 .6 .5 .5 .5 .6 .5 .5 [illegible] .5 .5 .5 .5 .5 .7 .7 .6 .5 .5 .5 .4 .4 .5 .6 .7 .8 .9 1.0 .9 .8 .7 .7 .6 .6 .5
.6 .8 .9 .9 .9 .8 .7 .7 .8 .7 .7 .8 .5 .7 .7 .9 1.0 .8 .8 .8 1.0 1.2 1.0 1.0 1.0 1.1 1.1 1.2 1.2 1.2 1.2 1.1 .8 .9 .8 .7
1.4 1.1 1.1 .9 .9 1.0 1.1 1.2 1.4 1.5 1.3 1.2 1.0 1.1 1.1 1.1 1.0 [illegible] .9 1.4 1.5 1.8 1.4 1.1 1.4 1.6 1.6 1.5 1.6 1.7 1.9 2.0 1.3 1.4 1.3 1.2
1.5 1.2 .9 .7 .7 .5 1.0 1.9 3.5 2.7 1.9 [illegible] 1.5 1.4 1.2 1.0 .6 1.1 1.5 1.3 1.7 1.1 1.0 .9 1.0 1.4 1.5 1.4 1.8 2.0 2.2 2.1 2.3 2.2 2.3 2.0
1.3 1.0 .8 .5 .4 .4 2.8 3.3 2.6 3.7 2.4 2.0 1.6 1.0 .5 .5 .4 .9 1.1 .4 .5 .6 .4 .5 1.0 3.2 3.5 3.0 3.2 2.9 3.1 [illegible] 2.9 2.4 2.3 2.5
1.8 1.0 .7 .3 .5 .4 2.3 4.6 3.1 2.9 2.3 1.8 .8 .4 .4 .5 .4 .9 .6 .7 .5 .8 1.0 1.2 2.4 5.9 7.1 5.1 5.9 5.3 4.9 5.3 4.8 3.9 3.5 3.1
2.8 2.2 1.4 2.2 3.0 3.6 4.0 4.6 5.3 4.8 3.4 2.7 1.5 .8 1.5 2.1 4.4 5.3 5.9 5.2 4.2 3.5 2.6 1.5 3.2 4.8 5.1 5.1 5.2 5.3 6.2 5.7 5.0 4.7 3.5 2.9
3.9 3.4 2.2 2.1 2.0 2.4 3.0 3.5 3.1 4.5 5.0 4.3 3.3 2.0 3.5 3.4 3.7 4.2 4.4 4.8 4.5 2.9 1.8 3.6 4.1 4.1 3.5 4.2 4.4 4.1 4.4 5.3 5.1 4.9 5.5 4.1
2.5 1.7 .9 .5 .4 .4 .5 .5 .6 .7 2.2 3.2 1.9 1.5 1.5 .9 .7 .7 1.0 3.2 3.5 1.1 1.3 3.3 4.0 4.2 4.0 4.4 3.8 3.0 3.4 3.9 4.5 4.8 3.7 3.9
2.4 1.4 1.3 .7 .4 .4 .3 .7 .9 .6 .8 1.0 .5 .4 .7 .4 .3 .3 .3 .3 .3 .3 .4 .6 .5 1.2 1.8 2.3 .6 .3 .4 .6 1.5 2.5 2.3 2.6
1.6 1.8 2.6 2.7 1.9 1.0 .8 1.0 .7 .6 .9 1.4 1.9 2.1 1.1 .7 .5 .5 .3 .4 .4 .3 .3 .3 .3 .3 .4 .5 .4 .3 .4 .5 .6 1.0 1.7 2.2
2.2 2.5 2.3 2.5 2.5 1.9 1.6 2.4 2.3 1.5 1.2 1.5 2.3 2.5 2.4 1.7 1.1 1.4 1.5 1.0 1.4 1.0 .8 .6 .6 .5 .6 .6 .8 .7 .9 .8 1.0 1.4 1.4 2.1
2.4 2.2 1.3 1.4 1.6 1.5 1.7 2.3 2.5 2.0 2.0 2.4 2.2 2.1 1.8 1.5 1.4 1.5 1.9 2.0 1.9 2.0 1.9 1.7 1.7 1.6 1.4 1.4 1.6 1.5 1.5 1.4 1.4 1.2 1.4 1.9
1.5 1.7 1.8 1.3 1.2 1.0 1.2 1.4 1.5 1.7 2.1 2.1 2.0 1.7 1.7 1.7 1.4 1.6 1.3 1.8 2.4 2.4 2.1 2.0 1.5 1.4 1.4 1.4 1.6 1.8 1.9 1.9 1.8 1.6 1.5 1.5
1.4 1.4 1.3 1.5 1.6 1.5 1.3 1.3 1.5 1.5 1.7 2.3 2.9 2.3 2.2 1.8 1.4 1.6 1.5 1.7 1.9 1.9 1.6 1.4 1.8 1.5 1.5 1.8 1.7 1.2 1.2 1.4 1.9 1.9 1.7 1.5
1.8 2.3 2.8 3.1 3.1 3.2 2.8 2.4 2.4 2.2 2.1 1.9 2.0 2.2 2.4 2.7 2.5 2.4 2.5 2.2 1.8 1.5 1.1 .9 1.0 1.4 1.6 1.8 1.3 .9 .8 .9 1.2 1.4 1.4 1.5
2.8 3.1 3.3 3.3 3.6 3.7 3.5 3.0 2.7 2.4 2.0 1.6 1.6 1.8 1.8 2.2 2.0 1.8 1.7 1.3 1.0 .9 .9 .9 .9 1.0 1.0 .9 1.0 1.1 1.2 1.4 1.6 2.0 2.2 2.4

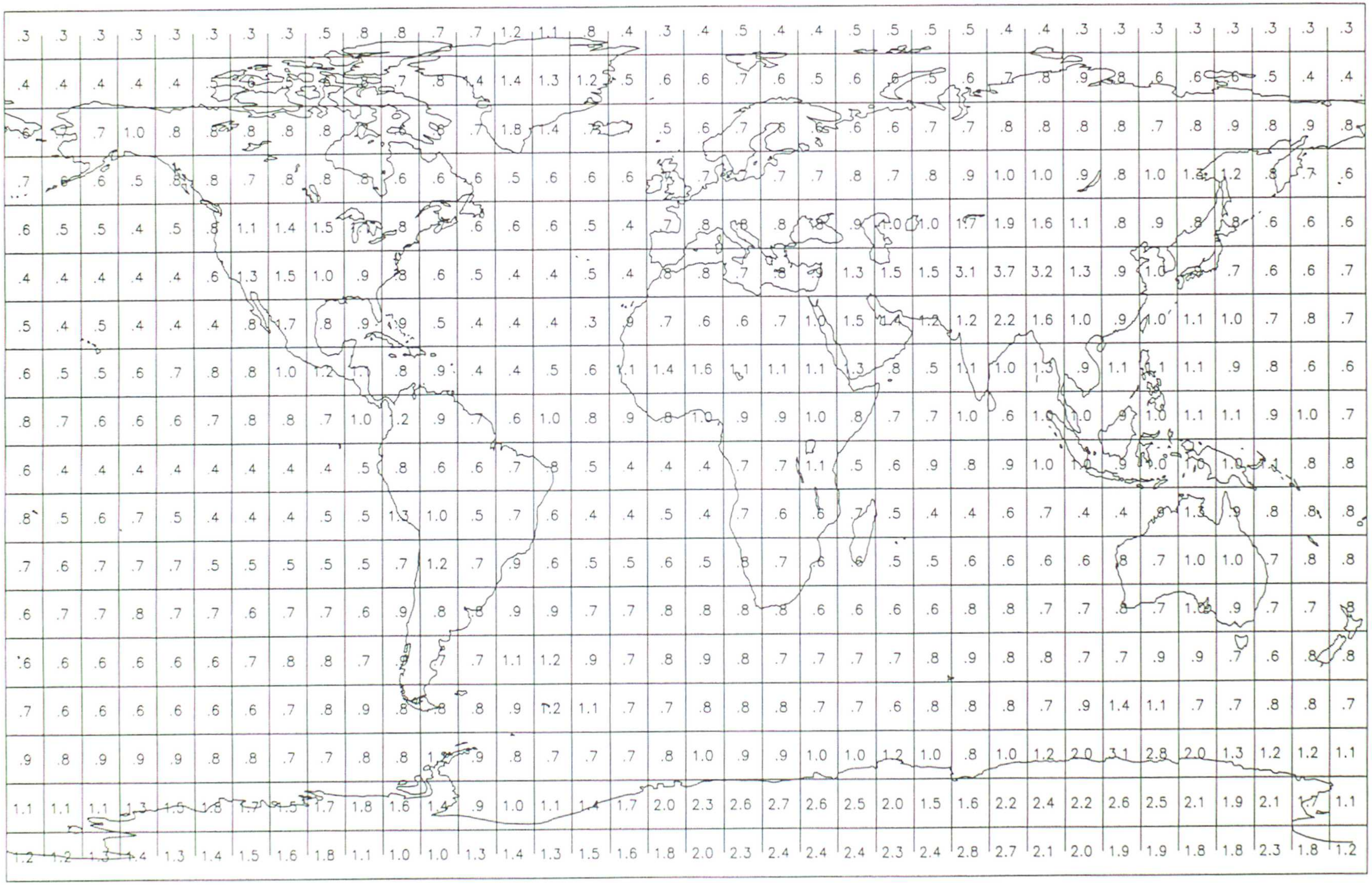
ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : AMSUA–5 Channel (700 hPa)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 34


.3 .2 .2 .2 .2 .2 .2 .3 .4 .6 .7 .5 .1 −.3 −.2 .4 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .2 .2 .3 .2 .2 .3 .3
.4 .4 .4 .4 .3 .3 .4 .4 .2 .7 −2.5 −2.6 −.2 .3 .4 .5 .3 .3 .5 .4 .2 .2 .1 −.1 −.1 −.3 .1 .1 .1 .1 .3 .4 .3
.4 .3 .6 .8 .5 .2 −.1 −.3 −.1 .4 .4 −.6 −.2 .3 .4 .5 .4 .3 .3 .3 .3 .3 .0 −.1 .3 .6 .5 .2 −.1 −.1 −.1 −.2 −.1 .3
.4 .3 .3 .4 .5 .4 −.1 −.2 .2 .4 .2 .2 .3 .5 .4 .4 .5 .0 .2 .1 .4 .5 .3 .2 −.4 −.2 .4 .3 −.1 .0 .2 .3 .3 .2 .3 .4
.4 .4 .4 .4 .4 .2 −.4 −.5 .0 .2 .2 .3 .4 .4 .4 .5 .2 .0 .1 .3 .2 .4 −.1 −.6 −.6 .1 .6 .5 .1 .2 .2 .0 .2 .3 .3
.4 .4 .5 .5 .4 .3 −.4 −.6 .3 .1 .1 .2 .3 .4 .4 .4 .4 −.2 −.1 .1 .1 .5 .8 .4 −.4 −.3 1.1 1.4 .4 .1 −.2 .1 .2 .2 .3 .3
.3 .5 .5 .6 .5 .5 .2 −.4 .1 −.1 .2 .2 .4 .5 .5 .5 −.1 −.3 .1 .6 .9 .3 .4 −.2 −.1 .3 .4 .3 .0 −.2 −.1 .0 .2 .2 .2
.4 .4 .5 .5 .4 .4 .3 .2 −.1 −.1 .2 .0 .5 .5 .5 .4 −.2 −.4 −.4 .4 .7 .3 .3 .3 .5 .0 .2 −.3 .1 .0 −.3 −.1 .0 .2 .3 .3
.3 .4 .4 .5 .4 .4 .4 .4 .5 .3 .2 .4 .3 .4 .3 .3 .3 .3 .3 .5 .6 .7 .6 .5 .4 .1 .4 −.1 −.1 −.1 −.2 .0 .0 .1 .0 .3
.5 .6 .5 .6 .6 .6 .6 .7 .6 .4 .6 .6 .6 .5 .4 .6 .6 .6 .6 .5 .8 .8 .5 .6 .3 .3 .2 .1 .0 .0 −.2 .1 −.1 .3 .2 .4
.3 .5 .4 .4 .5 .6 .6 .7 .6 .5 .9 1.0 .7 .7 .3 .6 .7 .7 .7 .9 .9 .6 .2 .5 .6 .6 .5 .5 .5 .5 .5 .3 .2 .2 .1 .2
.4 .5 .4 .5 .5 .6 .7 .7 .7 .7 .5 1.2 .6 .4 .6 .6 .7 .7 .7 .8 1.2 .5 .4 .5 .6 .7 .7 .6 .6 .6 1.0 .7 .6 .4 .3 .3
.6 .6 .7 .6 .7 .7 .7 .7 .7 .7 .7 1.0 .4 .5 .6 .7 .7 .7 .7 .5 .7 .7 .8 .8 .8 .8 .7 .7 .6 .6 .5 .5 .6 .5 .5 .3
.6 .8 .8 .8 .7 .7 .6 .6 .7 .7 .6 .7 .7 .7 .9 .7 .7 .8 .5 .6 .8 .9 .9 .8 .7 .8 .8 .8 .8 .7 .7 .6 .6 .7 .5 .4
.6 .8 .8 .8 .8 .8 .7 .8 .9 1.0 .6 .6 .7 .8 .8 .8 .7 .6 .5 .7 .8 .8 .8 .9 .8 .8 .7 .7 .7 .7 .8 .8 .8 .7 .6 .5
.4 .4 .5 .6 .6 .6 .6 .6 .8 .9 .8 .4 .0 .3 .6 .7 .8 .8 .9 1.0 1.0 .7 .6 .6 .7 .8 .6 .3 .2 .3 .3 .7 .7 .9 .9 .6
1.3 1.2 .9 .9 .8 1.1 1.5 1.3 1.7 2.0 1.4 1.0 .3 .7 .6 .6 −.1 −.6 −1.1 −1.0 −.5 .3 .4 −.4 −.3 −.4 .7 1.5 −.1 .1 −.3 −.2 .0 .3 1.0 1.1
.7 .7 .9 .6 1.5 1.5 1.6 2.4 2.6 1.4 .8 .3 .3 .2 .0 −.1 −.3 −.4 −.5 −.6 −1.0 −.8 .0 .6 .8 1.1 .2 −.8 −1.4 −1.5 −1.8 −1.6 −1.0 .6 .7 .6

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : AMSUA-5 channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

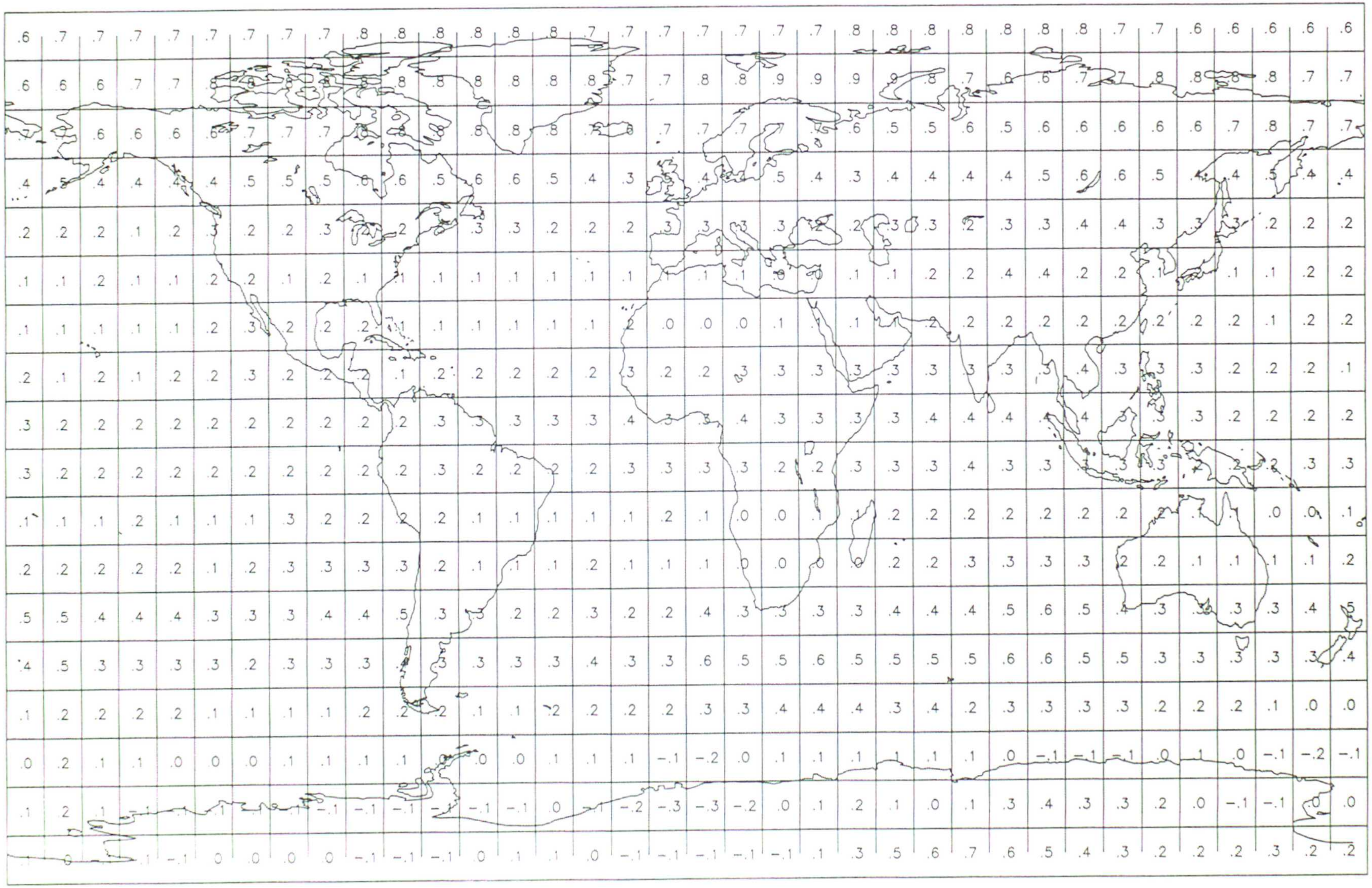
FIGURE 35



.3	.3	.3	.3	.3	.3	.3	.3	.5	.8	.8	.7	.7	1.2	1.1	.8	.4	.3	.4	.5	.4	.4	.5	.5	.5	.5	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3
.4	.4	.4	.4	.4	.5	.6	.5	.6	.8	.7	.8	.4	1.4	1.3	1.2	.5	.6	.6	.7	.6	.5	.6	.6	.5	.6	.7	.8	.9	.8	.6	.6	.6	.5	.4	.4
.6	.7	.7	1.0	.8	.8	.8	.8	.8	.7	.6	.8	.7	1.8	1.4	.7		.5	.6	.7	.6	.6	.6	.6	.7	.7	.8	.8	.8	.8	.7	.8	.9	.8	.9	.8
.7	.6	.6	.5	.8	.8	.7	.8	.8	.8	.6	.6	.6	.5	.6	.6	.6		.7	.7	.7	.7	.8	.7	.8	.9	1.0	1.0	.9	.8	1.0	1.3	1.2	.8	.7	.6
.6	.5	.5	.4	.5	.8	1.1	1.4	1.5	[illegible]	.8		.6	.6	.6	.5	.4	.7	.8	.8	.8	.8	.9	1.0	1.0	1.7	1.9	1.6	1.1	.8	.9	.8	.8	.6	.6	.6
.4	.4	.4	.4	.4	.6	1.3	1.5	1.0	.9	.8	.6	.5	.4	.4	.5	.4	.8	.8	.7	.8	.9	1.3	1.5	1.5	3.1	3.7	3.2	1.3	.9	1.0	[illegible]	.7	.6	.6	.7
.5	.4	.5	.4	.4	.4	.8	1.7	.8	.9	.9	.5	.4	.4	.4	.3	.9	.7	.6	.6	.7	1.0	1.5	1.4	1.2	1.2	2.2	1.6	1.0	.9	1.0	1.1	1.0	.7	.8	.7
.6	.5	.5	.6	.7	.8	.8	1.0	1.2	[illegible]	.8	.9	.4	.4	.5	.6	1.1	1.4	1.6	1.1	1.1	1.1	1.3	.8	.5	1.1	1.0	1.3	.9	1.1	1.1	1.1	.9	.8	.6	.6
.8	.7	.6	.6	.6	.7	.8	.8	.7	1.0	1.2	.9	.7	.6	1.0	.8	.9	.8	1.0	.9	.9	1.0	.8	.7	.7	1.0	.6	1.0	1.0	.9	1.0	1.1	1.1	.9	1.0	.7
.6	.4	.4	.4	.4	.4	.4	.4	.4	.5	.8	.6	.6	.7	.8	.5	.4	.4	.4	.7	.7	1.1	.5	.6	.9	.8	.9	1.0	1.0	.9	1.0	1.0	1.0	1.1	.8	.8
.8	.5	.6	.7	.5	.4	.4	.4	.5	.5	1.3	1.0	.5	.7	.6	.4	.4	.5	.4	.7	.6	.6	.7	.5	.4	.4	.6	.7	.4	.4	.9	1.3	.9	.8	.8	.8
.7	.6	.7	.7	.7	.5	.5	.5	.5	.5	.7	1.2	.7	.9	.6	.5	.5	.6	.5	.8	.7	.6	.6	.5	.5	.6	.6	.6	.6	.8	.7	1.0	1.0	.7	.8	.8
.6	.7	.7	.8	.7	.7	.6	.7	.7	.6	.9	.8	.8	.9	.9	.7	.7	.8	.8	.8	.8	.6	.6	.6	.6	.8	.8	.7	.7	.8	.7	1.0	.9	.7	.7	.8
.6	.6	.6	.6	.6	.6	.7	.8	.8	.7	.9	.7	.7	1.1	1.2	.9	.7	.8	.9	.8	.7	.7	.7	.7	.8	.9	.8	.8	.7	.7	.9	.9	.7	.6	.8	.8
.7	.6	.6	.6	.6	.6	.6	.7	.8	.9	.8	.8	.8	.9	1.2	1.1	.7	.7	.8	.8	.8	.7	.7	.6	.8	.8	.8	.7	.9	1.4	1.1	.7	.7	.8	.8	.7
.9	.8	.9	.9	.9	.8	.8	.7	.7	.8	.8	[illegible]	.9	.8	.7	.7	.7	.8	1.0	.9	.9	1.0	1.0	1.2	1.0	.8	1.0	1.2	2.0	3.1	2.8	2.0	1.3	1.2	1.2	1.1
1.1	1.1	1.1	1.3	1.5	1.8	1.7	1.5	1.7	1.8	1.6	1.4	.9	1.0	1.1	1.4	1.7	2.0	2.3	2.6	2.7	2.6	2.5	2.0	1.5	1.6	2.2	2.4	2.2	2.6	2.5	2.1	1.9	2.1	1.7	1.1
1.2	1.2	1.3	1.4	1.3	1.4	1.5	1.6	1.8	1.1	1.0	1.0	1.3	1.4	1.3	1.5	1.6	1.8	2.0	2.3	2.4	2.4	2.4	2.3	2.4	2.8	2.7	2.1	2.0	1.9	1.9	1.8	1.8	2.3	1.8	1.2

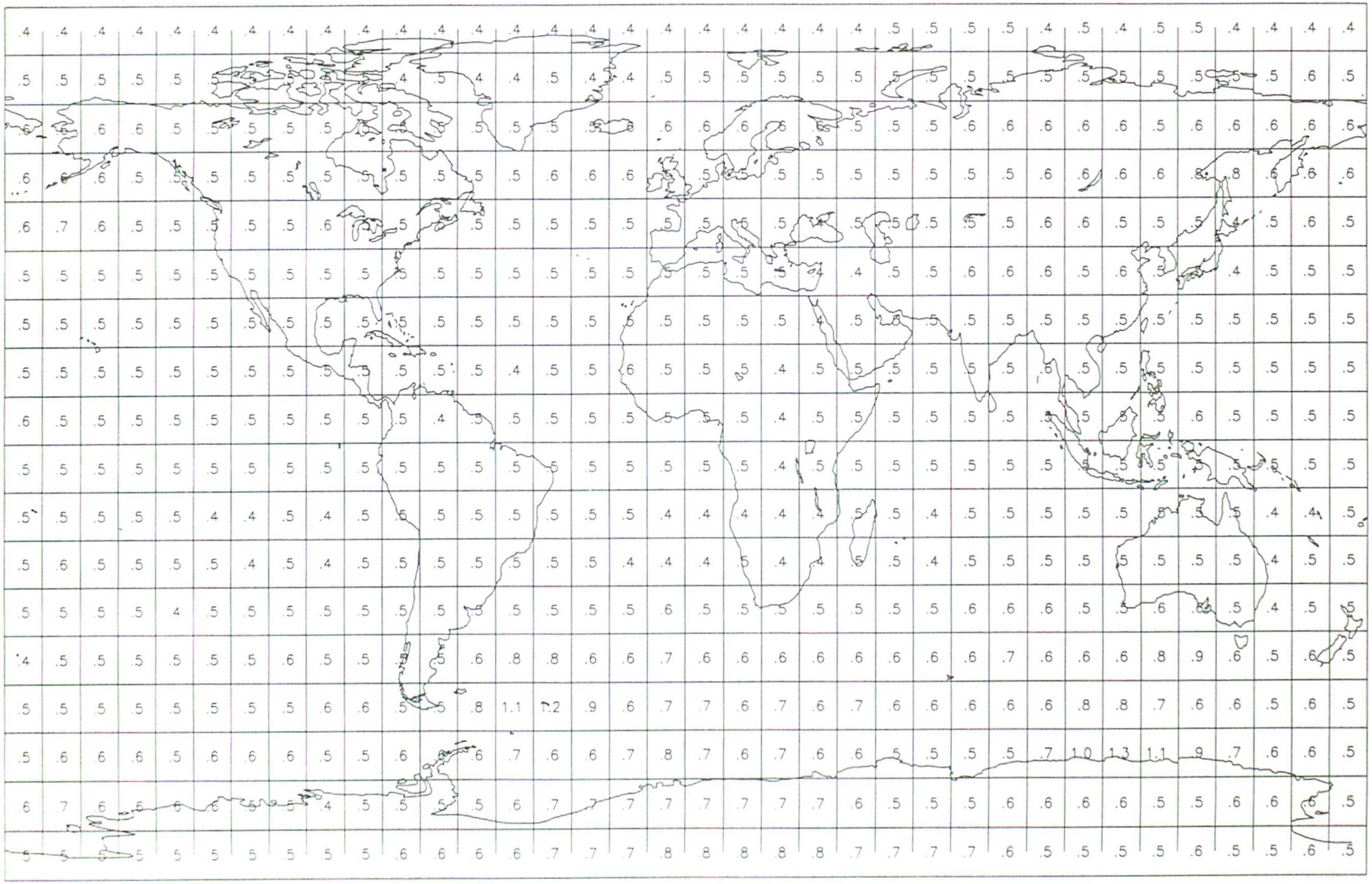
ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : AMSUA-7 Channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 36


.6 .7 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .7 .7 .7 .7 .7 .7 .7 .8 .8 .8 .8 .8 .8 .8 .7 .7 .6 .6 .6 .6 .6
.6 .6 .6 .7 .7 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .8 .8 .9 .9 .9 .9 .8 .7 .6 .6 .7 .7 .8 .8 .8 .8 .7 .7
.7 .7 .6 .6 .6 .6 .7 .7 .7 .8 .8 .8 .8 .8 .8 .7 .6 .7 .7 .7 .7 .7 .6 .5 .5 .6 .5 .6 .6 .6 .6 .6 .7 .8 .7 .7
.4 .5 .4 .4 .4 .4 .5 .5 .5 .6 .6 .5 .6 .6 .5 .4 .3 .5 .4 .4 .5 .4 .3 .4 .4 .4 .4 .5 .6 .6 .5 .4 .4 .5 .4 .4
.2 .2 .2 .1 .2 .3 .2 .2 .3 .2 .2 .3 .3 .2 .2 .2 .3 .3 .3 .3 .2 .2 .3 .3 .2 .3 .3 .4 .4 .3 .3 .3 .2 .2 .2
.1 .1 .2 .1 .1 .2 .2 .1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .0 .0 .1 .1 .2 .2 .4 .4 .2 .2 .1 .1 .1 .2 .2
.1 .1 .1 .1 .1 .2 .3 .2 .2 .2 .1 .1 .1 .1 .1 .1 .2 .0 .0 .0 .1 .1 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .2 .2
.2 .1 .2 .1 .2 .2 .3 .2 .2 .2 .1 .2 .2 .2 .2 .2 .3 .2 .2 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .2 .2 .2 .1
.3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3 .3 .3 .2 .2 .2 .2
.3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .2 .2 .2 .2 .3 .3 .3 .3 .2 .2 .3 .3 .3 .4 .3 .3 .3 .3 .3 .2 .2 .2 .3 .3
.1 .1 .1 .2 .1 .1 .1 .3 .2 .2 .2 .2 .1 .1 .1 .1 .1 .2 .1 .0 .0 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .0 .0 .1
.2 .2 .2 .2 .2 .1 .2 .3 .3 .3 .3 .2 .1 .1 .1 .2 .1 .1 .1 .0 .0 .0 .0 .2 .2 .3 .3 .3 .3 .2 .2 .1 .1 .1 .1 .2
.5 .5 .4 .4 .4 .3 .3 .3 .4 .4 .5 .3 .3 .2 .2 .3 .2 .2 .4 .3 .3 .3 .3 .4 .4 .4 .5 .6 .5 .4 .3 .3 .3 .3 .4 .5
.4 .5 .3 .3 .3 .3 .2 .3 .3 .3 .4 .3 .3 .3 .3 .4 .3 .3 .6 .5 .5 .6 .5 .5 .5 .5 .6 .6 .5 .5 .3 .3 .3 .3 .3 .4
.1 .2 .2 .2 .2 .1 .1 .1 .1 .2 .2 .2 .1 .1 .2 .2 .2 .2 .3 .3 .4 .4 .4 .3 .4 .2 .3 .3 .3 .3 .2 .2 .2 .1 .0 .0
.0 .2 .1 .1 .0 .0 .0 .1 .1 .1 .1 .0 .0 .0 .1 .1 .1 −.1 −.2 .0 .1 .1 .1 .1 .1 .1 .0 −.1 −.1 −.1 .0 .1 .0 −.1 −.2 −.1
.1 .2 .1 −.1 −.1 −.1 −.1 −.1 −.1 −.1 −.1 −.1 −.1 −.1 .0 −.1 −.2 −.3 −.3 −.2 .0 .1 .2 .1 .0 .1 .3 .4 .3 .3 .2 .0 −.1 −.1 .0 .0
.1 .0 .1 −.1 .0 .0 .0 .0 −.1 −.1 −.1 .0 .1 .1 .0 −.1 −.1 −.1 −.1 −.1 .1 .3 .5 .6 .7 .6 .5 .4 .3 .2 .2 .2 .3 .2 .2

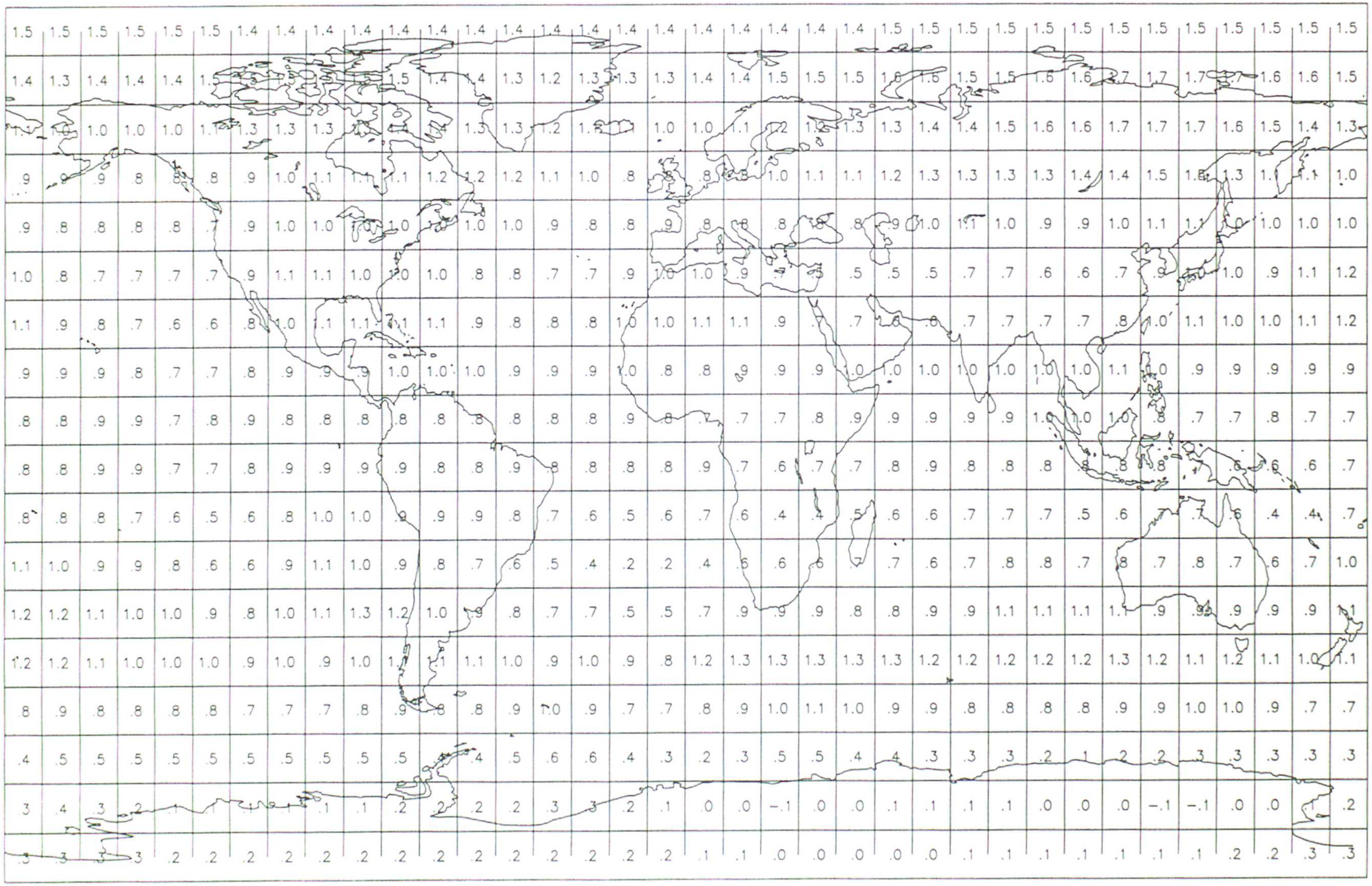
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : AMSUA-7 channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 37


.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .5 .4 .5 .5 .4 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .4 .4 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5
.6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .6 .6 .6 .6 .6 .5 .6 .6 .6 .6 .6
.6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .8 .8 .6 .6 .6
.6 .7 .6 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .6 .6 .5 .5 .5 .4 .5 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .5 .6 .6 .6 .5 .6 .5 .4 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .6 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5
.6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .4 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5
.5 .6 .5 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5 .4 .4 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5
.5 .5 .5 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .5 .5 .6 .6 .5 .4 .5 .5
.4 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .6 .8 .8 .6 .6 .7 .6 .6 .6 .6 .6 .6 .6 .6 .7 .6 .6 .6 .8 .9 .6 .5 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .5 .5 .8 1.1 1.2 .9 .6 .7 .7 .6 .7 .6 .7 .6 .6 .6 .6 .6 .8 .8 .7 .6 .6 .5 .6 .5
.5 .6 .6 .6 .5 .6 .6 .6 .5 .5 .6 .6 .6 .7 .6 .6 .7 .8 .7 .6 .7 .6 .6 .5 .5 .5 .5 .7 1.0 1.3 1.1 .9 .7 .6 .6 .5
.6 .7 .6 .6 .6 .6 .5 .5 .4 .5 .5 .5 .5 .6 .7 .7 .7 .7 .7 .7 .7 .7 .6 .5 .5 .5 .6 .6 .6 .6 .5 .5 .6 .6 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .7 .7 .7 .8 .8 .8 .8 .8 .7 .7 .7 .7 .6 .5 .5 .5 .5 .6 .5 .5 .6 .5

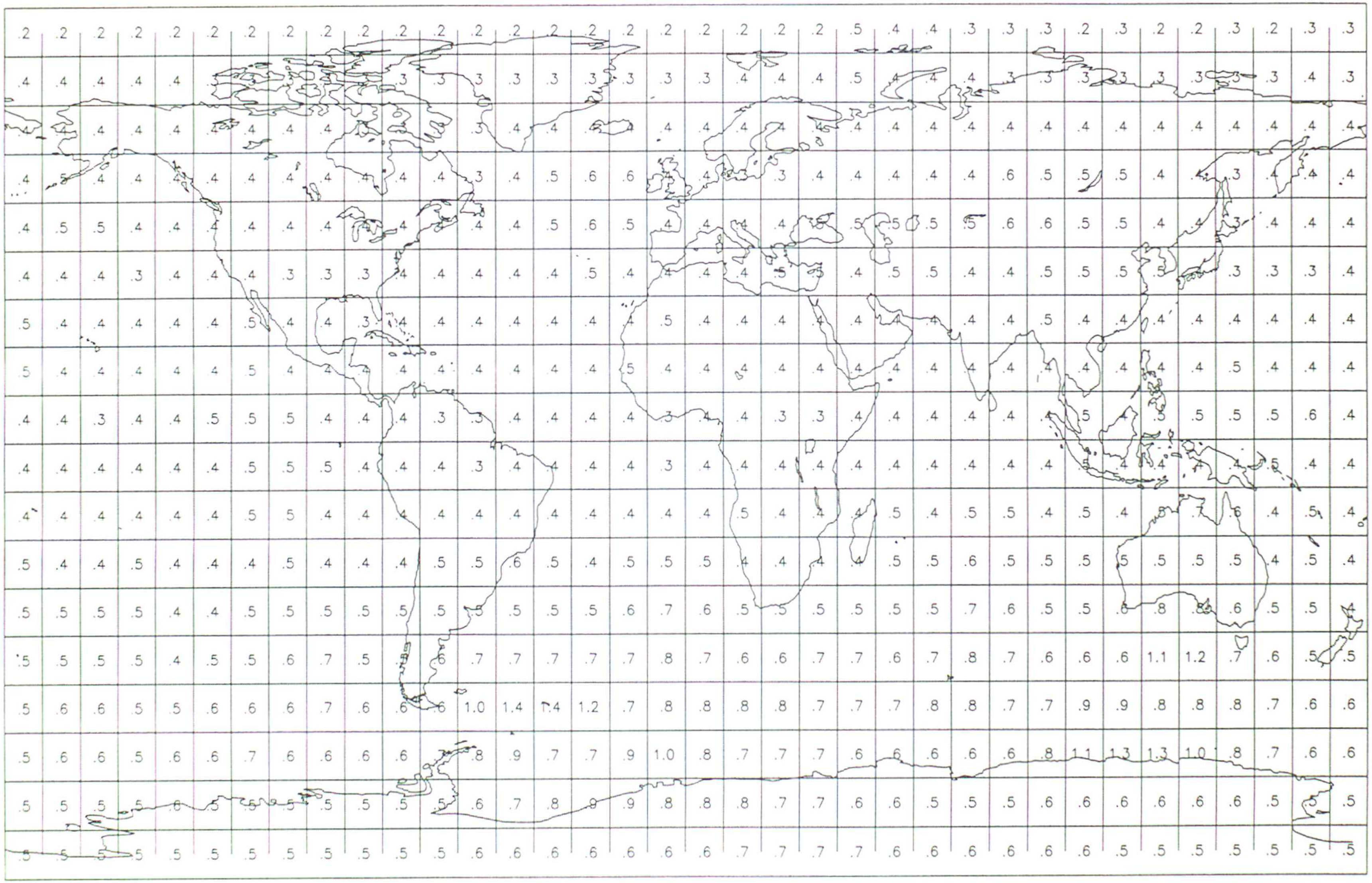
ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
JULY 1999 : AMSUA-9 Channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 38


1.5 1.5 1.5 1.5 1.5 1.5 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5
1.4 1.3 1.4 1.4 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.4 1.4 1.3 1.2 1.3 1.3 1.3 1.4 1.4 1.5 1.5 1.5 1.6 1.6 1.5 1.5 1.6 1.6 1.7 1.7 1.7 1.7 1.6 1.6 1.5
1.1 1.0 1.0 1.0 1.0 1.1 1.3 1.3 1.3 1.3 1.4 1.4 1.3 1.3 1.2 1.1 1.1 1.0 1.0 1.1 1.2 1.2 1.3 1.3 1.4 1.4 1.5 1.6 1.6 1.7 1.7 1.7 1.6 1.5 1.4 1.3
.9 .9 .9 .8 .8 .8 .9 1.0 1.1 1.1 1.1 1.2 1.2 1.2 1.1 1.0 .8 .8 .8 .8 1.0 1.1 1.1 1.2 1.3 1.3 1.3 1.3 1.4 1.4 1.5 1.6 1.3 1.1 1.1 1.0
.9 .8 .8 .8 .8 .7 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .8 .8 .9 .8 .8 .8 .8 .9 1.0 1.1 1.0 .9 .9 1.0 1.1 1.1 1.0 1.0 1.0 1.0
1.0 .8 .7 .7 .7 .7 .9 1.1 1.1 1.0 1.0 1.0 .8 .8 .7 .7 .9 1.0 1.0 .9 .7 .5 .5 .5 .5 .7 .7 .6 .6 .7 .9 1.0 1.0 .9 1.1 1.2
1.1 .9 .8 .7 .6 .6 .8 1.0 1.1 1.1 1.1 1.1 .9 .8 .8 .8 1.0 1.0 1.1 1.1 .9 .7 .7 .6 .6 .7 .7 .7 .7 .8 1.0 1.1 1.0 1.0 1.1 1.2
.9 .9 .9 .8 .7 .7 .8 .9 .9 .9 1.0 1.0 1.0 .9 .9 .9 1.0 .8 .8 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.0 .9 .9 .9 .9 .9
.8 .8 .9 .9 .7 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .8 .7 .7 .7 .8 .9 .9 .9 .9 .9 1.0 1.0 1.0 .8 .7 .7 .8 .7 .7
.8 .8 .9 .9 .7 .7 .8 .9 .9 .9 .9 .8 .8 .9 .8 .8 .8 .8 .9 .7 .6 .7 .7 .8 .9 .8 .8 .8 .8 .8 .8 .7 .6 .6 .6 .7
.8 .8 .8 .7 .6 .5 .6 .8 1.0 1.0 .9 .9 .9 .8 .7 .6 .5 .6 .7 .6 .4 .4 .5 .6 .6 .7 .7 .7 .5 .6 .7 .7 .6 .4 .4 .7
1.1 1.0 .9 .9 .8 .6 .6 .9 1.1 1.0 .9 .8 .7 .6 .5 .4 .2 .2 .4 .6 .6 .6 .7 .7 .6 .7 .8 .8 .7 .8 .7 .8 .7 .6 .7 1.0
1.2 1.2 1.1 1.0 1.0 .9 .8 1.0 1.1 1.3 1.2 1.0 .9 .8 .7 .7 .5 .5 .7 .9 .9 .9 .8 .8 .9 .9 1.1 1.1 1.1 1.1 .9 .9 .9 .9 .9 1.1
1.2 1.2 1.1 1.0 1.0 1.0 .9 1.0 .9 1.0 1.1 1.1 1.1 1.0 .9 1.0 .9 .8 1.2 1.3 1.3 1.3 1.3 1.3 1.2 1.2 1.2 1.2 1.2 1.3 1.2 1.1 1.2 1.1 1.0 1.1
.8 .9 .8 .8 .8 .8 .7 .7 .7 .8 .9 .8 .8 .9 1.0 .9 .7 .7 .8 .9 1.0 1.1 1.0 .9 .9 .8 .8 .8 .8 .9 .9 1.0 1.0 .9 .7 .7
.4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .5 .6 .6 .4 .3 .2 .3 .5 .5 .4 .4 .3 .3 .3 .2 .1 .2 .2 .3 .3 .3 .3 .3
.3 .4 .3 .2 .1 .1 .1 .1 .1 .1 .2 .2 .2 .2 .3 .3 .2 .1 .0 .0 −.1 .0 .0 .1 .1 .1 .1 .0 .0 .0 −.1 −.1 .0 .0 .1 .2
.3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .1 .1 .0 .0 .0 .0 .0 .1 .1 .1 .1 .1 .1 .1 .2 .2 .3 .3

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
JULY 1999 : AMSUA-9 channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 39



.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.5	.4	.4	.3	.3	.3	.2	.3	.2	.2	.3	.2	.3	.3
.4	.4	.4	.4	.4	.3	.3	.3	.3	[illegible]	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.4	.5	.4	.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.4	.3
.4	.4	.4	.4	.4	.4	.4	.4	.4	[illegible]	.3	.3	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.4	.5	.6	.6	.4	.4		.3	.4	.4	.4	.4	.4	.6	.5	.5	.5	.4	.4	.3	.4	.4	.4
.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.6	.5	.4	.4	.4	.4	.5	.5	.5	.5	.5	.6	.6	.5	.5	.4	.4	.3	.4	.4	.4
.4	.4	.4	.3	.4	.4	.4	.3	.3	.3	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.5	.5	.4	.5	.5	.4	.4	.5	.5	.5	.5		.3	.3	.3	.4
.5	.4	.4	.4	.4	.4	.5	.4	.4	.3	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4
.5	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4
.4	.4	.3	.4	.4	.5	.5	.5	.4	.4	.4	.3	.3	.4	.4	.4	.4	.3	.4	.4	.3	.3	.4	.4	.4	.4	.4	.4	.5	.4	.5	.5	.5	.5	.6	.4
.4	.4	.4	.4	.4	.4	.5	.5	.5	.4	.4	.4	.3	.4	.4	.4	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.4	.5	.4	.4
.4	.4	.4	.4	.4	.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.4	.4	.4	.5	.4	.5	.5	.4	.5	.4	.5	.7	.6	.4	.5	.4
.5	.4	.4	.5	.4	.4	.4	.5	.4	.4	.4	.5	.5	.6	.5	.4	.5	.5	.5	.4	.4	.4	.4	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4
.5	.5	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.7	.6	.5	.5	.5	.5	.5	.5	.7	.6	.5	.5	.6	.8	.8	.6	.5	.5	.4
.5	.5	.5	.5	.4	.5	.5	.6	.7	.5	.5	.6	.7	.7	.7	.7	.7	.8	.7	.6	.6	.7	.7	.6	.7	.8	.7	.6	.6	.6	1.1	1.2	.7	.6	.5	.5
.5	.6	.6	.5	.5	.6	.6	.6	.7	.6	.6	.6	1.0	1.4	1.4	1.2	.7	.8	.8	.8	.8	.7	.7	.7	.8	.8	.7	.7	.9	.9	.8	.8	.8	.7	.6	.6
.5	.6	.6	.5	.6	.6	.7	.6	.6	.6	.6	.7	.8	.9	.7	.7	.9	1.0	.8	.7	.7	.7	.6	.6	.6	.6	.6	.8	1.1	1.3	1.3	1.0	.8	.7	.6	.6
.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.6	.7	.8	.9	.9	.8	.8	.8	.7	.7	.6	.6	.5	.5	.5	.6	.6	.6	.6	.6	.6	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed (m s^{-1}) :Wind direction (degrees)
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the observation is veered to the background**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 m s^{-1} (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
24500	45.4	-82.8	ALL	P	SUR	1	0	0	0.0	-1.2	1.2
29907	24.8	-59.4	ALL	P	SUR	2	0	0	0.2	0.4	0.4
41502	25.1	-44.0	ALL	P	SUR	204	0	0	0.6	0.2	0.7
41503	16.5	-50.5	ALL	P	SUR	107	0	0	0.6	-0.2	0.6
41504	26.0	-77.2	ALL	P	SUR	241	0	0	0.6	0.2	0.6
41505	31.3	-57.2	ALL	P	SUR	280	0	0	0.6	0.1	0.6
41506	10.2	-58.8	ALL	P	SUR	115	0	0	1.0	-0.1	1.0
41520	20.7	-45.5	ALL	P	SUR	130	0	0	0.7	-0.3	0.7
41521	26.7	-56.9	ALL	P	SUR	276	0	0	0.6	0.1	0.6
41524	10.0	-51.2	ALL	P	SUR	106	0	0	0.8	-0.2	0.8
41525	15.1	-51.3	ALL	P	SUR	179	0	0	1.7	0.2	1.7
41528	29.5	-75.3	ALL	P	SUR	270	0	0	0.6	0.4	0.7
41598	25.1	-47.1	ALL	P	SUR	169	0	0	0.8	0.2	0.8
41599	27.6	-37.8	ALL	P	SUR	624	6	1	0.6	-0.4	0.7
41625	28.2	-77.4	ALL	P	SUR	260	0	0	0.6	0.3	0.7
41626	15.2	-53.5	ALL	P	SUR	172	2	1	0.6	0.0	0.6
41627	19.1	-57.3	ALL	P	SUR	315	1	0	1.1	0.4	1.2
41628	21.7	-57.5	ALL	P	SUR	175	1	1	0.6	0.5	0.8
41630	16.5	-50.4	ALL	P	SUR	184	0	0	1.1	-0.9	1.5
41636	26.8	-56.8	ALL	P	SUR	564	2	0	0.8	0.4	0.9
41637	25.8	-44.4	ALL	P	SUR	345	3	1	0.7	0.4	0.8
41638	25.6	-52.9	ALL	P	SUR	573	2	0	0.9	0.1	0.9
41640	11.5	-51.4	ALL	P	SUR	187	0	0	1.0	-0.5	1.1
41641	14.5	-47.1	ALL	P	SUR	156	0	0	1.1	-0.6	1.3
41643	20.7	-53.8	ALL	P	SUR	166	2	1	0.6	0.0	0.6
41644	16.1	-43.9	ALL	P	SUR	125	0	0	0.8	-0.1	0.8
41645	20.8	-46.9	ALL	P	SUR	169	1	1	0.6	-0.6	0.9
41646	20.5	-63.3	ALL	P	SUR	75	5	7	0.7	0.4	0.8
41647	21.5	-57.3	ALL	P	SUR	100	0	0	0.6	0.9	1.0
41648	41.3	-54.0	ALL	P	SUR	90	0	0	0.8	-0.7	1.0
44513	35.8	-36.0	ALL	P	SUR	105	0	0	0.6	-0.7	0.9
44514	47.0	-24.0	ALL	P	SUR	21	0	0	1.2	-1.5	1.9
44515	39.1	-35.7	ALL	P	SUR	49	0	0	0.6	0.0	0.6
44517	40.6	-34.2	ALL	P	SUR	40	1	2	0.7	-0.4	0.8
44546	43.9	-34.8	ALL	P	SUR	1805	0	0	0.9	-0.1	0.9
44607	53.4	-44.4	ALL	P	SUR	625	0	0	1.2	-0.7	1.4
44608	46.8	-30.1	ALL	P	SUR	1774	2	0	1.0	-0.3	1.1
44610	54.1	-36.7	ALL	P	SUR	1762	0	0	1.3	-0.5	1.4
44613	36.9	-19.3	ALL	P	SUR	1021	4	0	0.7	-0.2	0.7
44614	50.7	-47.7	ALL	P	SUR	356	0	0	1.1	-0.8	1.4
44616	58.1	-17.4	ALL	P	SUR	1874	35	2	1.1	-0.2	1.1
44621	47.7	-35.4	ALL	P	SUR	840	18	2	1.9	-0.9	2.1
44624	56.6	-21.1	ALL	P	SUR	1737	13	1	1.3	-0.5	1.4
44625	51.3	-39.1	ALL	P	SUR	602	0	0	1.6	-0.8	1.8
44626	48.2	-45.6	ALL	P	SUR	409	2	0	1.1	-0.5	1.2
44627	43.1	-56.3	ALL	P	SUR	320	0	0	0.7	-0.5	0.9
44628	39.7	-51.3	ALL	P	SUR	295	3	1	0.8	-0.1	0.8
44629	39.8	-46.8	ALL	P	SUR	298	0	0	1.6	1.3	2.1
44630	42.7	-49.7	ALL	P	SUR	310	0	0	0.8	-0.3	0.9
44728	51.8	-17.1	ALL	P	SUR	1022	9	1	1.4	-0.3	1.5
44742	44.4	-4.6	ALL	P	SUR	1077	5	0	0.8	0.0	0.8
44764	48.8	-5.3	ALL	P	SUR	860	5	1	1.7	-0.2	1.8
44765	32.2	-49.1	ALL	P	SUR	495	5	1	1.5	-0.3	1.5
44766	55.2	-41.6	ALL	P	SUR	1233	20	2	1.8	-0.8	2.0
44773	57.6	-32.6	ALL	P	SUR	1755	11	1	1.5	-0.9	1.7
44777	64.0	-31.5	ALL	P	SUR	1975	26	1	1.1	-0.4	1.1
44778	47.5	-8.2	ALL	P	SUR	1195	11	1	0.8	0.0	0.8
62505	46.4	-9.7	ALL	P	SUR	737	0	0	1.2	-0.1	1.2
62506	44.9	-16.6	ALL	P	SUR	620	0	0	2.2	-0.7	2.3
62520	37.0	-22.1	ALL	P	SUR	959	6	1	0.8	-0.6	1.0

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
62554	37.6	-14.3	ALL	P	SUR	910	1	0	1.0	0.0	1.0
62901	49.4	-8.2	ALL	P	SUR	185	0	0	0.6	0.4	0.7
64516	65.5	-33.9	ALL	P	SUR	2538	1	0	0.9	-0.5	1.0
64517	61.3	-53.4	ALL	P	SUR	2060	0	0	1.1	-0.7	1.3
64518	58.7	-42.2	ALL	P	SUR	1986	0	0	1.1	-0.8	1.4
64529	63.0	-10.5	ALL	P	SUR	1145	13	1	1.1	-0.5	1.2
64530	60.6	-34.7	ALL	P	SUR	443	1	0	1.1	-0.8	1.4
64692	65.2	-25.6	ALL	P	SUR	935	0	0	1.2	-0.7	1.4
64693	66.5	-24.1	ALL	P	SUR	968	0	0	1.0	-0.4	1.1
64694	66.7	-22.9	ALL	P	SUR	970	0	0	1.0	-0.6	1.2
64695	66.6	-23.7	ALL	P	SUR	1131	0	0	0.9	-0.3	1.0
64696	66.0	-23.8	ALL	P	SUR	439	1	0	1.0	-0.7	1.2
64697	65.5	-24.3	ALL	P	SUR	534	0	0	1.0	-0.6	1.1
64698	65.7	-26.1	ALL	P	SUR	1406	0	0	1.1	-0.6	1.3
64699	66.0	-28.1	ALL	P	SUR	1312	0	0	1.2	-0.5	1.3
64700	65.0	-26.4	ALL	P	SUR	1273	3	0	1.6	-0.3	1.7
64845	59.2	-11.7	ALL	P	SUR	1	0	0	0.0	-0.3	0.3
65593	60.3	-18.7	ALL	P	SUR	1102	11	1	1.4	-0.5	1.5
65594	61.9	-29.4	ALL	P	SUR	1175	14	1	1.2	-0.7	1.3
65595	58.3	-37.3	ALL	P	SUR	1459	20	1	1.5	-0.9	1.8
65599	62.7	-31.0	ALL	P	SUR	1996	26	1	1.2	-0.2	1.2
84500	44.3	-82.4	ALL	P	SUR	1	0	0	0.0	0.6	0.6
WIND SPEED											
29907	24.8	-59.4	ALL	SPEED	SUR	2	0	0	0.2	-1.4	1.4
41503	16.5	-50.5	ALL	SPEED	SUR	69	0	0	1.9	0.0	1.9
41504	26.0	-77.2	ALL	SPEED	SUR	15	0	0	2.0	-2.9	3.5
41520	20.7	-45.5	ALL	SPEED	SUR	85	0	0	1.4	0.6	1.6
41521	26.7	-56.9	ALL	SPEED	SUR	266	0	0	1.2	-0.6	1.4
41524	10.0	-51.2	ALL	SPEED	SUR	76	0	0	3.9	1.0	4.0
41625	28.2	-77.4	ALL	SPEED	SUR	232	0	0	1.3	-0.6	1.5
41630	16.5	-50.4	ALL	SPEED	SUR	91	0	0	1.5	0.0	1.5
41636	26.8	-56.8	ALL	SPEED	SUR	316	0	0	1.7	-1.7	2.4
41637	25.8	-44.4	ALL	SPEED	SUR	99	0	0	1.1	-2.0	2.2
41638	25.6	-52.9	ALL	SPEED	SUR	344	0	0	1.6	-1.4	2.1
41640	11.5	-51.4	ALL	SPEED	SUR	87	0	0	3.6	1.7	4.0
41641	14.5	-47.1	ALL	SPEED	SUR	74	0	0	1.9	0.1	1.9
41644	16.1	-43.9	ALL	SPEED	SUR	84	0	0	2.3	1.4	2.7
41648	41.3	-54.0	ALL	SPEED	SUR	6	0	0	1.2	0.9	1.5
44607	53.4	-44.4	ALL	SPEED	SUR	620	0	0	2.0	1.2	2.3
44713	57.2	-33.0	ALL	SPEED	SUR	1	0	0	0.0	-2.3	2.3
44773	57.6	-32.6	ALL	SPEED	SUR	1137	0	0	2.4	-0.2	2.4
44777	64.0	-31.5	ALL	SPEED	SUR	1290	0	0	2.1	-1.0	2.3
62505	46.4	-9.7	ALL	SPEED	SUR	696	0	0	1.2	0.3	1.3
62506	44.9	-16.6	ALL	SPEED	SUR	608	0	0	1.6	0.5	1.7
64845	59.2	-11.7	ALL	SPEED	SUR	1	0	0	0.0	-0.9	0.9
65599	62.7	-31.0	ALL	SPEED	SUR	1352	0	0	2.3	0.3	2.3
WIND DIRECTION											
29907	24.8	-59.4	ALL	DIRN.	SUR	1	0	0	0.0	28.1	28.1
41503	16.5	-50.5	ALL	DIRN.	SUR	64	0	0	19.4	-4.8	20.0
41504	26.0	-77.2	ALL	DIRN.	SUR	7	0	0	55.1	51.2	75.3
41520	20.7	-45.5	ALL	DIRN.	SUR	85	0	0	14.5	22.3	26.6
41521	26.7	-56.9	ALL	DIRN.	SUR	96	0	0	11.8	-7.0	13.7
41524	10.0	-51.2	ALL	DIRN.	SUR	15	0	0	29.6	-13.2	32.4
41625	28.2	-77.4	ALL	DIRN.	SUR	77	0	0	10.6	5.8	12.1
41630	16.5	-50.4	ALL	DIRN.	SUR	90	0	0	12.8	20.7	24.3
41636	26.8	-56.8	ALL	DIRN.	SUR	4	0	0	21.7	41.8	47.1
41637	25.8	-44.4	ALL	DIRN.	SUR	9	0	0	14.1	-95.0	96.1

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
WIND DIRECTION											
41638	25.6	-52.9	ALL	DIRN.	SUR	86	0	0	13.2	18.2	22.5
41640	11.5	-51.4	ALL	DIRN.	SUR	30	0	0	27.8	-6.3	28.5
41641	14.5	-47.1	ALL	DIRN.	SUR	63	0	0	17.2	35.4	39.3
41644	16.1	-43.9	ALL	DIRN.	SUR	77	0	0	14.3	9.9	17.4
41648	41.3	-54.0	ALL	DIRN.	SUR	6	0	0	26.9	23.6	35.8
44607	53.4	-44.4	ALL	DIRN.	SUR	389	0	0	18.7	7.1	20.1
44713	57.2	-33.0	ALL	DIRN.	SUR	1	0	0	0.0	41.1	41.1
44773	57.6	-32.6	ALL	DIRN.	SUR	842	0	0	16.2	-1.4	16.3
44777	64.0	-31.5	ALL	DIRN.	SUR	571	0	0	18.2	3.4	18.6
62505	46.4	-9.7	ALL	DIRN.	SUR	439	0	0	12.9	-17.5	21.7
62506	44.9	-16.6	ALL	DIRN.	SUR	377	0	0	19.7	-5.2	20.3
64845	59.2	-11.7	ALL	DIRN.	SUR	1	0	0	0.0	18.8	18.8
65599	62.7	-31.0	ALL	DIRN.	SUR	745	0	0	14.4	0.4	14.4

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	2931	1	10	1.8	0.0	2901	0	11	0	8.9	1.0
ACA	1856	0	7	2.0	-0.2	1869	0	7	0	7.5	0.8
AEA	214	0	7	1.8	0.5	201	1	11	0	9.0	0.0
AEL	400	2	22	2.2	0.3	410	0	22	0	8.5	0.7
AEY	23	0	0	1.5	1.1	24	0	0	0	6.0	1.6
AFL	329	0	8	2.4	0.6	330	0	8	0	8.7	1.3
AFR	1190	0	13	1.9	0.2	1193	0	12	0	7.1	0.9
AIH	188	1	5	1.8	0.1	189	0	5	0	5.9	-0.1
AJM	71	0	4	1.6	-0.6	71	0	4	0	6.7	1.5
AMM	77	1	8	1.9	0.4	75	0	8	0	7.1	1.6
AMT	27	0	26	1.9	0.0	31	0	26	0	8.1	0.5
AMX	200	2	6	1.9	0.1	199	1	5	0	8.4	1.6
ANZ	237	0	25	2.0	-1.1	231	0	26	0	5.9	0.7
AOM	396	1	8	2.0	0.9	408	0	8	0	8.1	1.0
AUA	23	0	0	1.9	0.2	22	0	0	0	6.4	0.0
AVA	242	0	4	1.7	0.0	245	0	4	0	9.2	1.6
AVE	23	0	9	1.5	0.4	23	0	13	0	13.5	0.2
AZA	507	1	10	2.5	0.7	508	0	11	0	9.2	1.3
BAF	27	0	7	1.4	-0.3	27	0	7	0	5.7	0.3
BAL	256	0	22	1.8	-0.6	254	0	22	0	9.4	0.6
BAW	1459	0	15	2.1	-0.2	1456	0	16	0	8.3	0.8
BLX	45	0	9	1.8	-0.4	48	0	13	0	8.6	0.4
BWA	98	0	10	1.9	1.4	98	1	13	0	8.7	0.8
CDN	867	0	5	1.8	0.3	863	0	6	0	7.7	0.7
CFG	494	0	4	2.2	-0.1	497	0	2	0	7.5	0.8
CKS	40	8	10	2.6	-0.3	42	0	5	0	11.3	0.9
CKT	98	0	5	2.4	1.2	97	0	3	0	8.3	0.9
CLX	379	0	9	1.9	-0.4	374	0	9	0	7.6	0.4
CMM	573	1	5	1.8	0.0	557	0	4	0	6.2	1.1
COA	978	0	10	1.7	0.1	984	0	17	0	13.8	3.3
CRL	335	1	5	1.5	0.4	335	0	6	0	7.5	0.9
CSA	25	0	8	2.1	-0.9	24	0	8	0	14.4	0.0
CTB	197	0	2	1.9	-0.4	195	1	2	0	6.5	1.0
CUB	256	0	9	1.9	0.5	255	0	9	0	8.5	0.1
DAL	2288	0	17	1.8	-0.5	2329	0	19	0	9.0	0.8
DBY	440	0	4	1.5	-0.3	442	0	4	0	8.0	0.6
DLH	2299	0	11	1.9	-0.1	2255	0	11	0	7.8	0.8
EEZ	37	3	14	1.7	-0.2	38	0	13	0	5.7	0.6
ELY	171	0	6	1.8	0.0	172	0	7	0	8.1	2.0
ETH	26	0	31	1.9	-0.2	30	0	37	0	11.8	-1.0
EWW	76	0	4	1.8	0.0	80	0	4	0	8.8	1.0
FDX	428	1	15	1.6	0.2	431	0	17	0	10.1	1.6
FIN	479	0	10	2.3	0.4	469	0	10	0	8.0	0.8
GAF	60	0	8	2.2	-0.2	59	0	7	0	9.9	1.9
GRL	48	0	0	1.4	0.0	45	2	2	0	5.6	0.5
GTI	55	2	20	2.3	0.4	55	0	20	0	8.3	0.8
HLF	54	2	13	1.5	-0.9	55	0	13	0	7.6	1.1
IBE	1503	1	23	2.1	0.7	1517	0	24	0	8.9	0.7
ICE	1050	0	6	2.0	0.2	1030	0	6	0	7.8	1.0
IWD	71	1	8	1.9	-0.1	70	1	4	0	6.9	1.3
JKK	147	0	8	1.5	-0.1	136	1	10	0	10.7	-0.8
KLM	2056	0	11	1.8	0.2	2054	0	12	0	8.0	1.1
LDA	46	0	11	1.7	0.0	48	0	15	0	12.0	-1.6
LDI	301	0	14	1.7	-0.8	298	0	15	0	8.2	0.5
LGL	25	0	4	1.9	-1.2	25	0	8	0	11.0	-0.2
LIB	148	1	7	1.6	1.0	148	0	7	0	7.6	0.8
LOT	345	1	7	2.3	-1.2	344	0	7	0	7.0	0.2
LTU	552	1	12	1.5	-0.3	551	0	13	0	8.4	1.0
MAS	47	0	4	1.8	0.9	47	0	4	0	8.5	0.1

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
MON	164	0	5	1.8	0.1	161	1	4	0	6.4	1.2
MPD	115	0	3	2.0	1.0	115	1	6	0	9.8	0.1
MPH	557	0	5	2.0	-0.6	560	0	5	0	8.2	1.2
NCA	24	0	4	1.6	0.3	22	0	9	0	9.0	0.7
NWA	3567	0	5	2.0	0.6	3326	0	4	0	8.4	0.9
OAL	27	0	22	3.1	0.7	27	0	19	0	10.9	3.8
PAC	91	2	13	2.2	0.8	95	0	11	0	8.4	2.2
RAM	49	2	8	1.5	0.4	49	0	6	0	6.9	1.0
RCH	130	2	8	1.8	0.4	138	0	21	0	13.7	1.2
RJA	43	2	14	2.1	-1.0	42	0	12	0	10.0	2.5
ROY	355	1	13	2.1	0.0	353	0	12	0	9.6	0.8
RRR	87	0	13	2.5	-0.1	85	0	12	0	7.0	1.0
SAB	33	3	15	2.6	0.0	36	0	14	0	9.4	1.7
SAS	1476	0	1	1.9	-0.3	1457	0	2	0	7.0	0.7
SIA	137	1	9	1.8	-0.8	142	0	10	0	7.7	1.1
SLR	115	1	61	3.2	0.3	120	0	19	0	7.3	0.6
SVA	127	1	6	1.9	-0.3	138	0	7	0	7.1	0.1
SWR	69	1	4	1.3	0.4	70	0	4	0	7.8	0.7
TAP	401	1	7	1.2	-0.3	401	0	10	0	9.6	0.6
TOW	185	2	12	2.2	0.7	185	1	11	0	10.0	2.5
TSC	225	0	10	2.3	0.8	225	0	12	0	10.0	1.5
TWA	1052	1	10	1.8	0.1	1000	0	12	0	8.8	0.6
UAL	2098	0	8	2.1	0.0	2086	0	9	0	7.7	0.9
UPS	714	1	24	1.9	0.2	710	0	25	0	9.7	0.5
USA	297	1	11	2.2	0.3	247	0	11	0	9.3	1.4
VIR	509	0	5	2.0	-0.2	513	0	5	0	7.8	1.1
VKG	39	3	10	2.5	1.3	38	0	5	0	6.7	0.1
WOA	88	0	10	2.1	0.8	88	0	9	0	8.2	0.3
BA	8376	0	1	1.4	0.2	8366	0	1	0	6.0	1.0
IT	130	0	77	3.0	1.0	129	0	74	0	5.3	1.9
KL	4211	0	7	1.7	0.7	4199	0	7	0	7.0	1.2
LH	617	0	1	2.0	1.0	615	0	0	0	5.2	0.6
N	341	1	4	2.4	0.8	350	0	4	0	7.4	0.8
US ACARS	13831	0	2	1.5	0.5	13835	0	2	0	7.2	0.9

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	16	0	13.1	20.1	15.3
DBBH	12	Z	100	18	0	13.7	20.4	15.1
DBLK	00	Z	100	1	0	0.0	7.0	7.0
DBLK	12	Z	100	9	0	23.6	37.0	28.4
DB0//M/	00	Z	100	1	0	0.0	4.0	4.0
E/ML5	00	Z	100	1	0	0.0	13.0	13.0
ELML7	00	Z	100	8	1	7.1	20.4	19.1
ELML7	12	Z	100	14	1	50.2	69.7	48.4
FNFP	00	Z	100	5	0	14.1	37.0	34.2
FNFP	12	Z	100	2	0	7.0	37.7	37.0
FNOR	00	Z	100	8	0	18.0	24.1	16.1
FNOR	12	Z	100	8	0	14.3	15.6	6.3
FNOU	00	Z	100	12	0	10.9	17.0	13.0
FNOU	12	Z	100	13	0	9.8	10.1	2.5
FNPH	00	Z	100	11	0	15.8	16.6	5.2
FNPH	12	Z	100	9	1	10.6	10.6	-0.6
FNRS	00	Z	100	14	0	10.9	15.0	10.3
FNRS	12	Z	100	15	0	10.2	10.4	1.9
JBOA	00	Z	100	1	0	0.0	7.0	7.0
JCCX	00	Z	100	1	0	0.0	16.0	16.0
JFDG	00	Z	100	1	0	0.0	2.0	-2.0
JGQH	00	Z	100	1	0	0.0	30.0	30.0
JIVB	00	Z	100	1	0	0.0	13.0	13.0
JNSR	00	Z	100	1	0	0.0	2.0	-2.0
LDWR	00	Z	100	22	0	11.5	13.8	7.5
LDWR	12	Z	100	22	0	8.0	8.1	1.5
OVYA2	00	Z	100	9	0	18.2	18.3	-1.7
OVYA2	12	Z	100	9	0	22.9	24.3	8.3
OXYH2	00	Z	100	12	0	10.7	21.2	18.3
OXYH2	12	Z	100	13	0	17.0	26.8	20.7
UCKZ	00	Z	100	3	0	24.5	46.3	39.3
V2XM	00	Z	100	1	0	0.0	32.0	-32.0
V2XM	12	Z	100	5	0	36.5	36.7	-3.8
XXBA	00	Z	100	1	0	0.0	52.0	52.0
XXBA	12	Z	100	1	0	0.0	66.0	66.0
ZCBP6	00	Z	100	1	0	0.0	45.0	45.0
ZCBP6	12	Z	100	1	0	0.0	49.0	49.0
ZDLP	00	Z	100	2	0	1.5	4.7	-4.5
ZDLP	12	Z	100	4	0	9.0	12.4	8.5
03953	00	Z	100	26	0	9.7	29.4	27.8
03953	12	Z	100	28	0	10.9	18.9	15.4
04018	00	Z	100	26	0	11.7	18.0	13.7
04018	12	Z	100	27	0	8.6	10.8	6.6
04220	00	Z	100	10	0	80.6	80.8	-5.3
04220	12	Z	100	5	0	8.0	25.7	24.4
04270	00	Z	100	27	0	9.7	11.3	5.9
04270	12	Z	100	24	0	9.5	10.1	3.5
04339	00	Z	100	23	0	11.1	16.1	11.7
04339	12	Z	100	14	0	10.3	10.6	2.5
04360	00	Z	100	27	0	15.8	22.0	15.2
04360	12	Z	100	28	0	10.8	16.3	12.1
08001	00	Z	100	16	0	8.6	24.4	22.8
08001	12	Z	100	16	0	10.9	12.1	5.3
08508	00	Z	100	1	0	0.0	34.0	-34.0
08508	12	Z	100	14	0	9.4	9.5	-0.9
08522	00	Z	100	1	0	0.0	14.0	-14.0
08522	12	Z	100	18	0	9.6	10.0	-2.8
08594	00	Z	100	9	0	17.6	18.5	5.6
08594	12	Z	100	14	0	18.0	19.1	-6.4
60020	00	Z	100	1	0	0.0	49.0	49.0

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
60020	12	Z	100	2	0	5.0	9.4	-8.0
71600	00	Z	100	27	0	9.1	17.1	-14.5
71600	12	Z	100	28	0	12.0	25.3	-22.2
72201	00	Z	100	24	1	34.2	43.3	26.5
72201	12	Z	100	25	0	14.9	33.4	29.9
72402	00	Z	100	23	0	14.1	45.0	42.7
72402	12	Z	100	27	0	16.1	47.5	44.7
74494	00	Z	100	24	0	12.8	20.3	15.8
74494	12	Z	100	26	0	11.8	13.7	-6.8
78016	00	Z	100	25	0	10.1	18.8	15.9
78016	12	Z	100	25	0	16.5	20.8	12.6

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :GEOPOTENTIAL HEIGHT in metres

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	17	0	9.0	9.1	1.5
DBBH	12	Z	500	21	0	7.2	7.3	0.9
DBLK	00	Z	500	1	0	0.0	12.0	-12.0
DBLK	12	Z	500	10	1	7.4	7.4	-0.4
DB0//M/	00	Z	500	1	0	0.0	3.0	-3.0
E/ML5	00	Z	500	1	0	0.0	7.0	7.0
ELM/7	00	Z	500	1	0	0.0	4.0	4.0
ELML7	00	Z	500	15	0	26.4	26.4	-1.6
ELML7	12	Z	500	17	1	6.6	12.0	10.1
FNFP	00	Z	500	5	0	6.1	14.9	13.6
FNFP	12	Z	500	2	0	0.5	13.5	13.5
FNOR	00	Z	500	9	0	9.7	11.6	6.3
FNOR	12	Z	500	8	0	5.5	6.0	2.3
FNOU	00	Z	500	13	0	6.8	7.2	2.5
FNOU	12	Z	500	14	0	5.4	6.5	3.5
FNPH	00	Z	500	11	0	6.4	6.4	-0.5
FNPH	12	Z	500	9	1	9.9	10.0	-1.3
FNRS	00	Z	500	15	0	9.5	9.5	0.5
FNRS	12	Z	500	15	0	7.8	7.9	-1.1
JBOA	00	Z	500	1	0	0.0	2.0	2.0
JCCX	00	Z	500	1	0	0.0	0.0	0.0
JFDG	00	Z	500	1	0	0.0	1.0	1.0
JGQH	00	Z	500	1	0	0.0	11.0	11.0
JIVB	00	Z	500	1	0	0.0	9.0	9.0
JNSR	00	Z	500	1	0	0.0	14.0	-14.0
LDWR	00	Z	500	25	0	9.6	9.8	2.4
LDWR	12	Z	500	23	0	8.1	9.2	-4.4
OVYA2	00	Z	500	10	0	8.3	11.9	-8.5
OVYA2	12	Z	500	10	0	11.9	16.7	-11.7
OXYH2	00	Z	500	14	0	7.8	10.3	6.7
OXYH2	12	Z	500	16	0	15.6	20.2	12.8
UCKZ	00	Z	500	3	0	16.8	16.9	1.7
V2XM	00	Z	500	1	0	0.0	36.0	-36.0
V2XM	12	Z	500	5	0	20.0	20.2	-2.8
XXBA	00	Z	500	1	0	0.0	10.0	10.0
XXBA	12	Z	500	1	0	0.0	19.0	19.0
ZCBP6	00	Z	500	1	0	0.0	53.0	53.0
ZCBP6	12	Z	500	1	0	0.0	43.0	43.0
ZDLP	00	Z	500	4	0	12.1	12.6	-3.5
ZDLP	12	Z	500	4	0	3.9	4.8	2.8
03953	00	Z	500	28	0	7.9	13.8	11.3
03953	12	Z	500	28	0	9.1	10.5	5.3
04018	00	Z	500	28	0	9.7	11.7	6.6
04018	12	Z	500	28	0	7.7	8.2	2.9
04220	00	Z	500	27	0	8.3	13.6	10.8
04220	12	Z	500	27	0	8.3	10.9	7.0
04270	00	Z	500	27	0	9.5	9.5	-0.6
04270	12	Z	500	26	1	9.2	10.3	-4.5
04339	00	Z	500	26	0	9.9	12.3	7.2
04339	12	Z	500	27	0	10.2	10.5	-2.2
04360	00	Z	500	27	0	9.7	9.8	0.6
04360	12	Z	500	28	0	7.0	7.1	1.2
08001	00	Z	500	27	0	7.9	9.3	4.9
08001	12	Z	500	28	0	6.7	7.8	-4.0
08508	00	Z	500	1	0	0.0	13.0	-13.0
08508	12	Z	500	25	0	7.8	7.8	-0.2
08522	00	Z	500	1	0	0.0	1.0	-1.0
08522	12	Z	500	18	0	5.4	5.4	0.5
08594	00	Z	500	11	0	9.4	9.7	-2.5
08594	12	Z	500	20	0	7.7	11.3	-8.3

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
60020	00	Z	500	26	0	7.5	8.2	3.5
60020	12	Z	500	27	0	10.9	11.3	-3.1
71600	00	Z	500	27	0	4.8	9.4	-8.1
71600	12	Z	500	28	0	8.1	9.9	-5.6
72201	00	Z	500	24	1	8.1	16.8	14.8
72201	12	Z	500	25	0	4.5	9.5	8.4
72402	00	Z	500	24	0	8.3	10.9	7.0
72402	12	Z	500	28	0	9.6	13.2	9.0
74494	00	Z	500	24	0	8.4	8.4	0.3
74494	12	Z	500	26	0	7.7	7.8	-0.7
78016	00	Z	500	25	0	8.9	14.8	11.8
78016	12	Z	500	26	0	14.3	20.6	14.7

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	15	0	0	0.0	-0.1	0.0
DBBH	12	V	100	15	0	0	2.6	0.9	-0.5
DBLK	00	V	100	1	0	0	4.7	-1.8	4.1
DBLK	12	V	100	10	0	0	4.7	-1.0	0.1
DB0//M/	00	V	100	1	0	0	2.6	-3.1	-2.0
E/ML5	00	V	100	1	0	0	2.6	2.1	1.3
ELML7	00	V	100	5	0	0	2.6	0.2	1.9
ELML7	12	V	100	9	0	0	2.6	3.8	-2.9
FNFP	00	V	100	4	0	0	2.6	5.1	0.3
FNFP	12	V	100	2	0	0	2.6	1.8	-1.0
FNOR	00	V	100	8	0	0	2.6	-0.7	0.8
FNOR	12	V	100	5	0	0	2.6	-0.1	0.5
FNOU	00	V	100	12	0	0	2.6	0.5	-0.2
FNOU	12	V	100	12	0	0	3.6	-0.2	-0.5
FNPH	00	V	100	8	0	0	2.6	-0.4	0.6
FNPH	12	V	100	6	0	0	2.6	0.4	-0.1
FNRS	00	V	100	12	0	0	2.6	-0.6	2.0
FNRS	12	V	100	14	0	0	3.1	0.1	-1.7
JBOA	00	V	100	1	0	0	2.3	-0.2	-0.9
JFDG	00	V	100	1	0	0	2.9	-1.3	0.2
JGQH	00	V	100	1	0	0	2.9	3.5	2.0
JIVB	00	V	100	1	0	0	2.9	1.2	-0.2
JNSR	00	V	100	1	0	0	2.9	3.0	-2.0
LDWR	00	V	100	22	0	0	2.9	0.0	0.8
LDWR	12	V	100	22	0	0	2.0	-0.4	-0.3
OVYA2	00	V	100	9	0	0	1.8	0.0	0.2
OVYA2	12	V	100	9	0	0	1.8	-1.1	-0.2
OXYH2	00	V	100	10	0	20	1.8	-4.2	-0.1
OXYH2	12	V	100	11	0	0	2.5	-0.5	-0.7
V2XM	12	V	100	1	0	0	3.0	-3.7	-0.7
ZCBP6	00	V	100	1	0	0	3.0	-6.0	0.2
ZCBP6	12	V	100	1	0	0	3.0	0.7	-4.3
ZDLP	00	V	100	1	0	0	3.0	-1.2	-0.6
ZDLP	12	V	100	3	0	0	3.0	-0.3	0.9
03953	00	V	100	26	0	0	2.0	0.1	0.7
03953	12	V	100	27	0	0	1.8	-0.6	0.7
04018	00	V	100	25	0	0	1.7	-0.5	-0.2
04018	12	V	100	27	0	0	1.4	-1.2	-0.3
04220	00	V	100	5	0	0	1.7	0.4	0.1
04220	12	V	100	5	0	0	1.7	0.1	-1.9
04270	00	V	100	25	0	0	1.7	-0.2	-0.2
04270	12	V	100	19	0	0	1.9	-0.4	0.2
04339	00	V	100	14	0	0	3.2	-1.1	-1.3
04339	12	V	100	8	0	0	3.3	-0.8	-0.1
04360	00	V	100	27	0	0	3.3	0.0	0.2
04360	12	V	100	27	0	0	1.8	0.2	-0.7
08001	00	V	100	9	0	0	6.1	2.0	1.8
08001	12	V	100	10	0	0	6.1	1.0	-1.4
08508	00	V	100	1	0	0	4.2	-1.0	-6.3
08508	12	V	100	11	0	0	4.2	-0.7	0.0
08594	00	V	100	8	0	0	1.9	0.5	-2.4
08594	12	V	100	16	0	0	1.9	0.3	-1.1
71600	00	V	100	25	0	4	2.0	-1.1	1.3
71600	12	V	100	26	0	0	3.5	0.2	0.0
72201	00	V	100	22	0	0	2.3	1.5	-0.1
72201	12	V	100	25	0	0	2.6	-0.6	1.1
72402	00	V	100	22	0	0	2.9	0.4	0.2
72402	12	V	100	27	0	0	3.2	-0.4	0.3
74494	00	V	100	24	0	0	2.6	0.7	1.4
74494	12	V	100	26	0	0	2.5	-1.0	1.4
78016	00	V	100	25	0	0	16.4	-0.1	1.4
78016	12	V	100	24	0	0	2.9	-0.7	-0.7

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	17	0	0	0.0	0.6	-0.2
DBBH	12	V	500	16	0	0	3.9	0.7	0.3
DBLK	00	V	500	1	0	0	2.6	-7.7	6.9
DBLK	12	V	500	11	0	0	2.6	2.4	-1.1
DB0//M/	00	V	500	1	0	0	2.7	0.2	-3.0
E/ML5	00	V	500	1	0	0	2.7	-0.7	0.0
ELML7	00	V	500	12	0	0	2.7	0.8	-0.8
ELML7	12	V	500	16	0	0	3.2	1.2	0.2
ELMN7	00	V	500	1	0	0	2.6	-2.1	-1.1
FNFP	00	V	500	4	0	0	2.6	0.5	-3.4
FNFP	12	V	500	2	0	0	2.6	2.4	1.2
FNOR	00	V	500	7	0	0	2.6	-1.7	0.8
FNOR	12	V	500	7	0	0	2.6	-0.3	1.7
FNOU	00	V	500	13	0	0	2.6	0.1	-0.1
FNOU	12	V	500	13	0	0	2.2	-0.1	-0.3
FNPH	00	V	500	9	0	0	1.9	0.0	-0.3
FNPH	12	V	500	7	0	0	1.9	-1.3	0.0
FNRS	00	V	500	13	0	0	1.9	-1.2	-0.2
FNRS	12	V	500	14	0	0	2.6	0.4	0.8
JBOA	00	V	500	1	0	0	3.7	0.6	1.0
JFDG	00	V	500	1	0	0	3.1	-0.8	0.6
JGQH	00	V	500	1	0	0	3.1	-0.9	-1.8
JIVB	00	V	500	1	0	0	3.1	0.5	1.4
JNSR	00	V	500	1	0	0	3.1	-0.7	-2.6
LDWR	00	V	500	24	0	0	3.1	-0.4	0.7
LDWR	12	V	500	23	0	0	2.8	0.6	0.2
OVYA2	00	V	500	10	0	0	2.3	-0.8	0.3
OVYA2	12	V	500	10	0	0	2.6	-0.1	0.3
OXYH2	00	V	500	13	0	15	1.8	-2.3	0.2
OXYH2	12	V	500	14	0	0	5.2	0.6	-0.8
V2XM	12	V	500	1	0	0	2.9	-0.7	-0.6
ZCBP6	00	V	500	1	0	0	2.9	0.0	0.0
ZCBP6	12	V	500	1	0	0	2.9	1.3	-7.3
ZDLP	00	V	500	4	0	0	2.9	-0.4	0.6
ZDLP	12	V	500	4	0	0	2.9	0.7	0.7
03953	00	V	500	28	0	0	2.7	1.4	0.2
03953	12	V	500	27	0	0	3.5	0.2	-0.3
04018	00	V	500	28	0	0	2.6	0.5	-0.4
04018	12	V	500	28	0	0	2.5	0.2	-1.4
04220	00	V	500	23	0	0	2.1	-1.2	-0.9
04220	12	V	500	25	0	0	3.3	-1.2	-0.6
04270	00	V	500	25	0	0	2.3	-0.3	-0.2
04270	12	V	500	22	0	0	2.1	-0.3	0.3
04339	00	V	500	23	0	0	3.1	-1.3	0.7
04339	12	V	500	23	0	0	3.5	-0.3	0.4
04360	00	V	500	27	0	0	2.5	0.6	0.5
04360	12	V	500	28	0	0	1.8	0.2	0.3
08001	00	V	500	20	0	0	3.2	1.5	0.8
08001	12	V	500	21	0	0	3.2	-0.6	0.0
08508	00	V	500	1	0	0	3.3	-1.3	-3.7
08508	12	V	500	22	0	0	3.3	-0.3	-0.1
08594	00	V	500	11	0	0	2.9	0.3	-2.3
08594	12	V	500	23	0	0	2.9	0.2	-1.2
60020	00	V	500	24	0	0	2.1	-0.1	0.1
60020	12	V	500	24	0	0	3.0	0.4	1.4
71600	00	V	500	27	0	0	3.4	0.0	0.7
71600	12	V	500	25	0	0	2.1	-0.2	0.5
72201	00	V	500	22	0	0	3.3	0.4	0.6
72201	12	V	500	25	0	0	2.4	-0.9	1.3
72402	00	V	500	24	0	0	1.8	1.2	-0.7
72402	12	V	500	28	0	0	2.1	0.4	0.5
74494	00	V	500	24	0	0	2.5	-0.1	0.6
74494	12	V	500	26	0	0	2.4	0.2	1.1
78016	00	V	500	25	0	0	2.2	-0.5	0.2
78016	12	V	500	25	0	0	2.2	-0.1	0.5

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45